Contents

Contents 1

Summary 2

Zusammenfassung 5

Acknowledgements 8

Part I: Synopsis 9

1 Introduction 10
- 1.1. About this thesis 10
- 1.2. Project framework 10
- 1.3. General topic: river restorations 11
- 1.4. Theoretical approach 12
- 1.5. Central research questions and their relevance 15
- 1.6. Overview of research papers 17

2 Research procedure 19
- 2.1. Research approach 19
- 2.2. Case study sites 21
  - *2.2.1. River Thur* *21*
  - 2.2.2. *Rivers Flaz/Inn* *23*
- 2.3. Research methods 24
  - *2.3.1. Case study I* *24*
  - *2.3.2. Case study II* *26*
  - 2.3.3. *Switzerland-wide surveys* *27*

3 Synthesis of findings and discussion 29
- 3.1. The social aspects of river restorations 29
- 3.2. Balancing the different objectives of sustainability for river restorations 33

4 Conclusions for river restoration practice and further research 37

5 References 39

Part II: Research papers 46

Paper I *Social science contributions to the participatory planning of water systems – results from Swiss case studies* 47

Paper II *Social relevance of river restorations: which actors should be involved in decision-making?* 48

Paper III *Aesthetic preferences versus ecological objectives in river restorations* 49

Paper IV *What influences public attitudes toward river restorations?* 50

Appendix 51
- A: Curriculum Vitae 52
- B: Questionnaire for survey of case study I 53
- C: Questionnaire for survey of case study II 54
- D: Questionnaire for nation-wide survey (written) 55
- E: Questionnaire for nation-wide survey (phone) 56

Summary

Rivers are an important integrating element of landscapes. Past river management has been directed towards controlling them, such as modifying, channeling or even putting them into culverts. This has led to an alarming decrease of biodiversity in and along the rivers and also to a variety of hydrological problems. As a reaction, the last few decades have been marked by a paradigmatic shift in the practice of river engineering. It has become common practice to again allow rivers more space and thus to augment the quality of riverine natural habitats. River restorations are today expected – even by law – to combine improved flood protection measures with the ecological rehabilitation of river corridors (BWG 2001; European Union 2000).

River restoration should follow the overall call for a sustainable landscape development involving a balance between ecological/hydrological, economic and social objectives. Swiss state guidelines give rather clear requirements for ecological and hydrological objectives that should be pursued in this context, while economic aspects are considered on a regular basis in water management plans of rivers by means of cost-benefit evaluations of different restoration scenarios. The inclusion of social objectives, such as for example public participation, is also called for in the respective laws, regulations and guidelines. While the ecological/ hydrological and economic aspects of river restoration have been subject to substantial previous research, little has been known on which social aspects there are and in which ways they should be involved.

It was therefore a first aim of this research to examine the social aspects within the sustainable development and management of rivers. It was a second aim of this research to examine whether there is a conflict between the social aspects and the other aspects and how a balance between them can be found in order to follow the demand for sustainable development in this area of river management.

Social aspects refer here to the social needs of local residents in regard to river corridors and their alteration through restoration. These can be needs of material/physical nature, needs having to do with the symbolic assignment of meaning to these spaces, or needs for local autonomy and participation in processes of local landscape change that river restorations entail.

The research was part of the interdisciplinary umbrella Rhone-Thur research project (financed by the Swiss Federal Office for the Environment (FOEN) together with the Swiss Federal Offices for Forest, Snow and Landscape Research (WSL) and Aquatic Research and Technology (EAWAG)). The dissertation is a cumulative work consisting of four research papers embedded in a surrounding synopsis. The papers are based on two qualitative and quantitative case studies of the Rivers Thur and Flaz/Inn and a Switzerland-wide representative survey conducted in a written format and by telephone.

Research paper I examines potential social science contributions to the participatory planning of water systems and specifically to river restoration projects. It is based on the results of the two case studies. While the implementation of computer-aided decisional procedures has become a helpful modern tool to increase efficiency in the planning and decision-making of river restorations, the findings show that the careful evaluation of the social, economic and cultural context of each river project, and a well-considered design of the participation and consensus-finding process, are also of high relevance for the success, and finally for the public acceptance, of such projects.

Research paper II investigates the social objectives of public participation in the planning and decision-making for river restoration projects and the question of which actors should be involved in this process. The analysis of data from the two case studies and the Switzerland-wide survey, compared against the background of two theoretical approaches to public participation, suggests that public involvement should not be restricted to a small circle of influential stakeholder groups. As restoration projects have been found to have a substantial impact on the quality of life of the local population, avoiding conflicts is only one of several objectives of the involvement process. Including the wider public provides a special opportunity to promote social objectives, such as trust-building, people's identification with their local environment, and their taking responsibility for it.

Research paper III asks whether aesthetic preferences of the public differ in comparison to ecological objectives of experts and project planners in river restorations. People's perceptions of the visual attractiveness of restoration scenarios were assessed with the help of the Switzerland-wide survey using photographic simulations of a river corridor. The reported preferences were related to experts' assessments of the ecological integrity of these scenarios based on eco-morphological criteria. The survey served further to assess how natural the public perceived the rivers scenarios to be and how much these corridors satisfy public needs. The results of the study show that aesthetic preferences relate more positively to eco-morphological quality than expected, and that the public's aesthetic preferences are primarily influenced by perceived naturalness. Even slightly improved eco-morphological quality was rated higher aesthetically. This suggests that the public views positively aesthetic outcomes of even small efforts to restore rivers.

Research paper IV examines which factors influence public attitudes towards river restoration. Statistical analysis of the representative Switzerland-wide survey data was used to test a conventional tripartite attitude-model consisting of cognitive, affective and behavioral factors. Additionally, the analysis contained social, procedural and flooding risk evaluation factors to examine their influence on attitude formation. The results show that tripartite model factors are relevant, but that social and procedural factors also make a significant contribution to explaining attitude toward river restoration. However, social and procedural (and flooding risk evaluation) factors seem to be additional predictors only for negative attitudes, but not for positive attitudes. Overall, all factors used in this study were much more capable of explaining variance in negative attitudes than in positive attitudes toward river restoration. These results help to better understand the nature of attitudes toward river restorations as an important part of landscape development. They also enhance managers' ability to avoid conflicts in regard to river restoration projects and to promote their active public support.

The four research papers bring attention to the broader aims of this research. The findings indicate that river corridors are a significant part of people's everyday environment and that people's relationships with them have a more pronounced living-space, rather than functional, character. The living-space dimension pertains to the meaning of local river reaches as recreational and ecologically valuable spaces and as spaces that are important for local identity. Aspects characterizing river stretches as functional spaces included their economic use, the actual and perceived flooding risks, rivers as channels for water drainage, and as an achievement of engineering.

The findings suggest that there is no substantial conflict between social and ecological objectives. The results of both the analysis of answers to verbal questions with regard to river restorations in general, and of the photo test of scenarios depicting different restoration measures in the Switzerland-wide survey showed a substantial overlap between public preference and expert objectives.

Interestingly, a comparison between the surveys of the local public and those of representatives of the organized stakeholder groups that are directly involved in deciding on river restorations, showed differing profiles. Locals tended to emphasise the improvement of recreational quality and naturalness as project objectives. Stakeholders were more likely to stress protecting economic use of land along the riverbanks. In general, the public had a more positive attitude towards restoration projects than the materially affected stakeholder groups (e.g. farmers, land-owners).

Involving organized stakeholders and local officials is often assumed to be the best possible water management practice and to be a progressive management scheme. However, the findings of this research indicate that involving the wider public, especially recreational users, helps in implementing far-reaching project objectives and in achieving better quality of decisions. Broadly based public inclusion in participatory planning seems to promote other social objectives besides conflict avoidance, such as increased identification of locals with their everyday living space and their feeling of responsibility for it. Swiss river restoration planning can only be said to conform with the goals of comprehensive sustainable landscape development if such objectives are also met.

Zusammenfassung

Flüsse sind ein wichtiges integrierendes Element der Landschaft. In der Vergangenheit orientierte sich der Wasserbau an der Idee der Gewässerkorrektur von Fliessgewässern, das heisst an ihrer Verbauung, Kanalisierung oder gar Überdeckung. Dies führte nicht nur zu einer alarmierenden Abnahme der Biodiversität in und an den Fliessgewässern, sondern auch zu einer Reihe von hydrologischen Problemen. Als Reaktion auf diese Entwicklung waren die letzten Jahrzehnte durch einen Paradigmenwechsel im Wasserbau gekennzeichnet. In der heutigen Praxis wird den Fliessgewässern wieder mehr Raum zugestanden und somit die Qualität der dort befindlichen natürlichen Lebensräume gesteigert. Neuere gesetzliche Richtlinien schreiben konkret vor, dass verbesserter Hochwasserschutz soweit möglich mit der ökologischen Rehabilitierung von Fliessgewässerkorridoren kombiniert werden muss (BWG 2001; European Union 2000).

Die Revitalisierung von Fliessgewässern ist der übergeordneten Vision der nachhaltigen Landschaftsentwicklung verpflichtet, die nach einer Vermittlung von ökologischen/hydrologischen, ökonomischen und sozialen Zielen strebt. Die Richtlinien des Schweizer Wasserbaus machen relativ klare Vorgaben hinsichtlich ökologischer und hydrologischer Zielstellungen, die in diesem Kontext verfolgt werden sollten. Ökonomische Aspekte werden in der Wasserbaupraxis ebenfalls auf regulärer Basis in der Form von Kosten-Nutzen Analysen für verschiedene Revitalisierungsszenarien berücksichtigt. Auch der Einbezug sozialer Zielstellungen, wie z.B. öffentliche Partizipation, wird in den entsprechenden Gesetzen und Richtlinien gefordert. Während ein hoher Forschungs- und Wissensstand hinsichtlich der ökologischen, hydrologischen und ökonomischen Aspekte von Flussrevitalisierungen existiert, wurden die Fragen, welche sozialen Aspekte es zu berücksichtigen gilt und in welcher Weise dies geschehen sollte, bisher – gerade auch wegen fehlender wissenschaftlicher Grundlagen - weitgehend vernachlässigt.

Deshalb war es ein erstes Forschungsziel dieser Arbeit, die sozialen Aspekte als Teil eines nachhaltigen Fliessgewässer-Managements zu untersuchen. Ein zweites Forschungsziel war es zu prüfen, ob im Kontext von Flussrevitalisierungen zwischen den sozialen Zielen einerseits und den ökologischen und wirtschaftlichen Zielen andererseits ein Konflikt besteht, sowie wie eine Balance zwischen diesen Aspekten gefunden werden kann.

Soziale Aspekte beziehen sich hierbei auf die sozialen Bedürfnisse der lokalen Bevölkerung hinsichtlich der Flussräume und ihrer Veränderung durch Revitalisierungen. Hierbei kann es sich sowohl um materielle/physische Bedürfnisse handeln, als auch um Bedürfnisse, die sich auf eine symbolische Bedeutungszuweisung dieser Räume beziehen. Weiterhin können dies Bedürfnisse nach lokaler Autonomie und Mitwirkung in Prozessen der lokalen Landschaftsveränderung sein, die mit Flussrevitalisierungen einhergeht.

Die Forschungsarbeit war Teil des interdisziplinären Rhone-Thur Projekts (finanziert durch das Bundesamt für Umwelt (BAFU) und die Eidgenössischen Forschungsanstalten WSL und Eawag). Die Dissertation hat eine kumulative Form, bestehend aus vier Forschungsartikeln und einer zusammenfassenden Synopsis. Die Artikel basieren auf zwei Fallstudien an den Flüssen Thur und Flaz/Inn sowie einer repräsentativen Schweizweiten Befragung, die sowohl schriftlich als auch telephonisch durchgeführt wurde.

Artikel I untersucht potentielle sozialwissenschaftliche Beiträge zur partizipativen Planung im Wasserbau und speziell bei Fliessgewässer-Revitalisierungen. Er basiert auf den Resultaten der beiden Fallstudien. Die Ergebnisse zeigen, dass Computer gestützte Entscheidungshilfen, die zu hilfreichen modernen Hilfsmittel geworden sind, um die Effizienz in der Planung und Entscheidungsfindung bei Flussrevitalisierungen zu verbessern, für den Erfolg eines Projektes nicht genügen. Ebenfalls nötig ist die sorgfältige Bewertung des sozialen, ökonomischen und kulturellen Kontextes eines jeden Flussrevitalisierungs-Projekts sowie ein gut durchdachtes Design des Mitwirkungs- und Entscheidungsfindungsprozesses. Diese sind von hoher Relevanz für die öffentliche Akzeptanz solcher Projekte.

Artikel II erkundet die sozialen Ziele öffentlicher Mitwirkung in der Planung und Entscheidungsfindung bei Flussrevitalisierungen und die Frage, welche Akteure in diesen Prozess mit einbezogen werden sollten. Die Analyse der Daten der beiden Fallstudien und der Gesamtschweizer Befragung vor dem Hintergrund zweier theoretischer Zugänge zu öffentlicher Partizipation deutet darauf hin, dass sich öffentliche Mitwirkung nicht nur auf das Ziel der Konfliktvermeidung und entsprechend auf den Einbezug eines relativ kleinen Kreises einflussreicher Interessensgruppen beschränken sollte. Da sich zeigte, dass Revitalisierungsprojekte einen bedeutenden Einfluss auf die Lebensqualität der lokalen Bevölkerung haben, ist die breitere Bevölkerung ebenfalls zu involvieren. Dies bietet eine wichtige Gelegenheit, soziale Ziele, wie z.B. die Bildung von Vertrauen, die Identifikation der Bevölkerung mit ihrer lokalen Alltagsumgebung und ihre vermehrte Verantwortungs-bereitschaft für diese zu fördern.

Artikel III beschäftigt sich mit der Frage, ob sich die ästhetischen Präferenzen der Bevölkerung von ökologischen Zielstellungen der Experten und Projektplaner von Flussrevitalisierungen unterscheiden. Wie die Bevölkerung die Attraktivität von Revitalisierungen visuell wahrnahm, wurde mit Hilfe von Photo-Szenarien in der Gesamtschweizer Befragung untersucht. Die Präferenzen der Befragten wurden mit der Expertenbewertung von ökologischer Integrität, basierend auf ökomorphologischen Kriterien, dieser Szenarien verglichen. Die Befragung diente weiterhin dazu festzustellen, wie natürlich die Bevölkerung die Flussszenarien wahrnahm und wie stark diese Flussräume ihre Bedürfnisse erfüllten. Die Ergebnisse zeigen, dass die ästhetischen Präferenzen stärker als erwartet mit der ökomorphologischen Qualität übereinstimmen und dass sie in erster Linie durch die wahrgenommene Natürlichkeit beeinflusst werden. Selbst leichte Verbesserungen der ökomorphologischen Qualität wurden ästhetisch höher bewertet. Dies legt die Schlussfolgerung nahe, dass die Bevölkerung die ästhetische Wirkung selbst geringer Revitalisierungsbemühungen als positiv erachtet.

Artikel IV untersucht, welche Faktoren die Einstellung der Bevölkerung hinsichtlich Flussrevitalisierungen beeinflusst. Die statistische Analyse der repräsentativen Gesamtschweizer Befragung wurde genutzt, um ein konventionelles tripartites Einstellungs-Modell zu testen, das kognitive, affektive und Verhaltensfaktoren einschliesst. Zudem wurde der Einfluss weiterer über das tripartite Modell hinausreichender Faktoren auf die Einstellungsformation untersucht – insbesondere soziale und prozedurale Faktoren sowie einen Faktor, der die Bewertung des Hochwasserrisikos beschreibt. Die Ergebnisse zeigen einerseits, dass die tripartiten Modellfaktoren relevant sind. Andererseits bestätigen sie auch einen signifikanten Beitrag der sozialen und prozeduralen Faktoren für die Erklärung der Einstellungsbildung hinsichtlich Flussrevitalisierungen.
Soziale, prozedurale und Riskowahrnehmungs-Faktoren scheinen jedoch zusätzliche Prädiktoren lediglich für negative und nicht für positive Einstellungen zu sein. Übergreifend

konnten alle in dieser Studie mit einbezogenen Faktoren einen deutlich grösseren Anteil der Varianz der negativen Einstellungen als der positiven Einstellungen gegenüber Flussrevitalisierungen erklären. Diese Erkenntnisse ermöglichen ein besseres Verständnis der Einstellungsbildung gegenüber Flussrevitalisierungen als einem wichtigem Teil der Landschaftsentwicklung. Sie liefern den Planern zudem Grundlagen dazu, wie sie Konflikte in Revitalisierungsprojekten verbessert vermeiden und deren aktive öffentliche Befürwortung fördern können.

Die vier Artikel geben Aufschluss über die breiteren Forschungsziele dieser Dissertation. Die Ergebnisse zeigen, dass Flussräume für die Bevölkerung einen wichtigen Teil des Lebensraumes darstellen und dass ihre Beziehung zu ihnen einen deutlich stärkeren lebensweltlichen als funktionalen Charakter hat. Die lebensweltliche Dimension bezieht sich auf Flusskorridore als Erholungs- und ökologisch wertvolle Räume sowie als wichtige Räume für die lokale Identitätsbildung. Aspekte, die Flusskorridore als funktionale Räume beschreiben, sind ihre wirtschaftliche Nutzung, ihr Gefahrenpotential, ihre Bedeutung als eine Errungenschaft der Technik und ihre Funktion als Entwässerungsrinnen.

Die Forschungsergebnisse weisen darauf hin, dass kein bedeutender Konflikt zwischen den sozialen und den ökologischen Zielen besteht. Die Resultate sowohl der Analyse der verbalen Fragen bezüglich Flussrevitalisierungen generell als auch der Phototest, der Szenarien mit verschiedenen Revitalisierungsmassnahmen als Teil der Gesamtschweizer Umfrage darstellte, zeigt interessanterweise eine substantielle Übereinstimmung zwischen den Präferenzen der Bevölkerung und den Zielen der Experten.

Ein Vergleich zwischen den Befragungsdaten der lokalen Bevölkerung und jenen der organisierten Interessengruppen, die direkt in den Entscheidungsfindungsprozess involviert sind, zeigt hingegen unterschiedliche Profile. Die lokale Bevölkerung tendiert dazu, die Verbesserung der Erholungsnutzung und der Natürlichkeit des Flussraums zu unterstreichen. Die Interessengruppen hingegen unterstreichen die Erhaltung der wirtschaftlichen Nutzung der Fluss-Vorländer. Generell hat die Bevölkerung eine positivere Einstellung gegenüber Flussrevitalisierungen als die materiell betroffenen Interessensgruppen, wie z.B. Landwirte und Landeigentümer.

Die Ergebnisse der Forschungsarbeit zeigen schliesslich, dass der Einbezug der breiten Bevölkerung und besonders der Erholungsnutzer der Umsetzung weit reichender Projektzielen sowie der Qualität der Entscheidungen zuträglich wäre. Die Mitwirkung organisierter Interessensgruppen und lokaler Gemeindevertreter wurde bisher als bestmögliche Wasserbaupraxis und als fortschrittliche Managementstrategie betrachtet. Eine möglichst breit angelegte partizipative Planung fördert jedoch weiterführende soziale Ziele jenseits der Konfliktvermeidung, wie z.B. die Identifikation der lokalen Bevölkerung mit ihrem Lebensraum und ihr Verantwortungsbewusstsein für ihn. Die Planung von Flussrevitalisierungen in der Schweiz kann mit den Zielen einer umfassenden nachhaltigen Landschaftsentwicklung erst einhergehen, wenn diese sozialen Ziele ebenfalls mit einbezogen werden.

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My PhD study developed as part of the Rhone-Thur project, which was financed by the Swiss Federal Office of the Environment (FOEN) together with the Swiss Federal Research Institutes WSL and Eawag. It was a great opportunity to work within this interdisciplinary and transdisciplinary context. I would especially like to thank all members of the working groups 'success-evaluation' and 'decision-support' for many fruitful discussions.

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Zürich, May 2008

Part I: Synopsis

1 Introduction

1.1. About this thesis

Restoration of rivers has become an important part of contemporary landscape planning. River restoration projects tend to receive much public attention, and frequently cause considerable controversy. In modern water management, the planning of watercourse restorations is oriented to the objectives of sustainable landscape development. Recent studies have mainly focused on ecological, hydrological and also economic aspects and much less on the social aspects of river restorations. In this thesis the broad aim was, therefore, to shed more light on the social aspects and how they interact with the other aspects involved in sustainable landscape development. Social aspects refer, in this thesis, to the social needs of local residents with regard to river corridors and their alteration through restoration. These can be material/physical needs (e.g. agricultural use of land along rivers; recreational use), but also needs relating to symbolic assignment of meaning to these spaces, or needs for local autonomy and participation in processes of such local landscape change.

This thesis is in the form of a cumulative dissertation, consisting of four research papers submitted to international journals and publications with a double-blind peer-reviewing procedure (see the list of papers in 1.6. and the detailed papers in part two). A synopsis provides first a general introduction, describing the larger framework of the thesis and the general topic of river restoration. It explains the underlying theoretical approach and introduces the central research questions. In the second chapter of the synopsis, the general research procedure is described in detail, while chapter three contains the actual research papers. In chapter four the main research findings are summarized and related to the central research questions. Chapter five finally draws conclusions for practical river restoration management and outlines future research needs, while Chapter 6 contains the references used in the thesis.

Issues described in more detail in the specific research papers are only mentioned briefly in the synopsis in order to avoid redundancy.

1.2. Project framework

This thesis forms part of an interdisciplinary umbrella research project – the so-called “Rhone-Thur project” (2001-2006), supported by the Swiss Federal Office for the Environment (FOEN) together with the Swiss Federal Research Institutes for Forest, Snow and Landscape Research (WSL) and Aquatic Science and Technology (EAWAG). Within the Rhone-Thur project, it is part of research module II on decision analysis, with the working title “Objectives of the Swiss public regarding river restorations”. Other social science subprojects within the Rhone-Thur project are the PhD theses by Hostmann (2005), “Decision support for river rehabilitation”, ETHZ and Ejderyan (2008), “Une renaturation en béton! Comment on a décidé que la Seymaz retrouverait ses marais”, GIUZ. Another PhD thesis produced in the wider context of the Rhone-Thur project is that of Zaugg Stern (2006), “Philosophiewandel im schweizerischen Wasserbau. Zur Vollzugspraxis des nachhaltigen Hochwasserschutzes”, GIUZ.

1.3. General topic: river restorations

Past engineering and human modification of river landscapes have led to an alarming decrease in biodiversity in and along rivers (Hygum 2001; Johnson et al. 2001), and also to a variety of hydrological problems (e.g. causing river bed erosion, increased risk of flooding; BWG 2001). As a reaction, a new philosophy in river management has developed (Zaugg Stern, 2006; Boon et al. 2000).

This new paradigm of water management, especially as it relates to hydraulic engineering practice, aims at combining flood protection with ecological measures. River restorations create more space again for watercourses, and thus provide suitable ecological habitats for plants and animals (Eiseltova 1995; Calow and Petts 1992). A river restoration is defined here as the "return of a river ecosystem to a close approximation of its condition prior to disturbance " (National Research Council 1992). It can also be defined as “the reestablishment of pre-disturbance aquatic functions and related physical, chemical and biological characteristics” (Cairns 1988).

The deterioration of river ecosystems in Switzerland has been mainly caused by a degradation in the eco-morphological quality and hydraulics of rivers (e.g. hydro-peaking and minimum flow regimes). Ecological and hydrological objectives thus include restoring river landscapes to near-natural levels of biological and physical integrity, with natural ecosystem functions and natural species diversity, restored natural river morphology and a natural discharge regime. Another main objective is to provide good flood protection (Hostmann 2005). Such river restoration measures include: widening riverbeds, re-connecting former side channels, floodplains and ox-bows, opening culverts, removing bed-load collectors and recreating near-natural, dynamic discharge and flow regimes (Woolsey et al. 2005). Only a minority of river restoration projects are planned and implemented mainly for ecological rehabilitation (28%). Most projects aim to improve both the ecological conditions and the level of flood protection (72%) (Bratrich 2004; BWG 2003; Hostmann 2005; percentages based on projects from 1996-2002).

River restorations comply with the overall call for sustainable landscape development comprising ecological/hydrological, economic and social aspects. Swiss government has regulations that specify rather clear ecological, hydrological and economic objectives that should be pursued in this context (WBG 1991; BWG 2001; BUWAL et al. 2003). Some of these are listed in the previous paragraph. Economic aspects are also considered on a regular basis in water management plans for rivers, and cost-benefit evaluations of different restoration scenarios are usually carried out.

The inclusion of social aspects is also called for in the associated laws, regulations and guidelines (WBG 1991; BWG 2001; BUWAL et al. 2003; Schweizerische Eidgenossenschaft 2003). Where these documents mention social aspects, this usually refers to public participation in planning and the provision of high recreational value through river landscapes. However, descriptions tend to be very abstract and generally without concrete details. No specifications about social aspects are usually given and how they should be taken into account. Rather for each project, water management planners currently have to define what their social objectives are and how they want to address them. It is often assumed that taking such social aspects into account will be counterproductive for attaining the far-reaching ecological objectives of river restorations. Since social aspects are not always appropriately detected and addressed, local conflicts around river restoration frequently arise, which often leads to projects being delayed or blocked (Bratrich 2004, Zaugg Stern 2006).

There is thus a need for research on identifying and addressing the social dimension of sustainable development and management of rivers, but so far little has been done in this area. Studying how public attitudes and aesthetic preferences regarding river restorations are formed should also contribute to ongoing theoretical research on landscape aesthetics and attitude theory. Knowing more about these issues should help to better accommodate public preferences and attitudes in planning river restoration projects. In addition, a better understanding of the social dimensions of river restorations and their relationships with the other dimensions is relevant both for river management practice and for the theoretical field of sustainable landscape planning and natural resource management.

1.4. Theoretical approach

Each individual research paper forming part of the main body of this thesis is based on the theoretical framework of the specific topic and contains in detail the associated state of the art. Thus, it is not the purpose of this section to provide a comprehensive description of the theoretical fundament of this thesis. Instead, it seeks to outline the general theoretical perspectives underlying the overarching research questions. One of these general theoretical perspectives is the concept of sustainable landscape development and another is Habermas' theory of communicative action (1981).

Sustainable landscape development provides the background for developing the research questions. The literature on sustainable landscape development is extensive and contains a wide variety of definitions of sustainability. In this thesis, a very basic definition is used, namely: " Sustainability is the conception of a durable development of the economic, ecological and social dimension of human existence. These three pillars of sustainability interact and require a balanced coordination" (DBT 1998, see also IISD 1997; OECD 1997; WCED 1987; Milbrath 1997). This notion of sustainability also constitutes the base of the common mission statement of the Swiss Federal Offices for the Environment, Agriculture and Spatial Planning (BUWAL/BWG 2003) for the future development of Swiss river management.

One of the objectives of sustainable development is thus to take the social aspects into consideration as well as the ecological and economic aspects. Social sustainability refers to addressing the social, economic and cultural needs of the local communities (Borrini-Feyerabend 1997). That is, these needs[1] – subsumed in this thesis under the term "social needs" – should also be taken into account in any sustainable landscape planning and more specifically in river management and restoration. The goal here is to find ways of realizing restoration projects that incorporate far-reaching ecological/hydrological, economic and social objectives.

In general, a theory of social sustainability is still lacking. One promising theoretical framework for exploring the questions of which social needs should be included in river restoration projects and in which ways they should be addressed is the theory of communicative action, as developed by Jürgen Habermas (1981). His theory helps to

[1] A distinction needs here to be drawn between the terms 'needs' and 'claims' of local communities. The term 'claim' is normally understood in the sense of a conscious right that can be called in/can be legally demanded. In contrast, 'need' refers here to something that has not necessarily become conscious to its beholder, that lies in the nature of man, (see e.g. Maslow, 1989) and that is not necessarily called in or legally demanded. That is, 'claim' represents a language subset in regard to 'need' in this understanding (see Mussel 1992).

distinguish between social needs on a functional or system integration scale and social needs on a social integration scale. For river restoration this would mean that the social dimension is examined not only in terms of material or functional needs and the negotiation of these needs, but also in terms of what values people hold, what meaning they attribute to river corridors and what role river areas play in their sense of identity.

System or functional integration is, according to Habermas (1981), the reduction in complexity a system needs to produce in order to maintain itself. In his terminology, the system's world of action refers to the fields of economy/market and policy/administration/government. Social integration mirrors a society's world view, ways of identity formation, and law and order assumptions. It refers to the life world as "the taken for granted universe of everyday existence … and as the saturation of communicative action by tradition and routinized ways of doing the things we do in our everyday actions" (Powell and Moody 2003, p.2).

According to Habermas, western society is undergoing a rationalization of both the systems world and the life world. On the systems level it implies there is an increasing functional differentiation of a market-regulated economy and the administration of modern states. Rationalization of the life world means that people are increasingly set free from traditional norms and interpretative models, i.e. that the formation of normative guidelines depends more on communicative action and the negotiation of consensus through rational argument.

In principle, the rationalization of the life world can be viewed positively, as Habermas argues, since it grants more freedom to people in their moral-practical decision-making and opens up new areas for more expressive and individual lifestyles (Treibel 1997). He even considers it to be a precondition for modernization of a society (Habermas 1981: 564). He sees it as leading to crisis only if the systems world "colonizes" the life world, i.e. if the subsystems of the systems world assume control of more areas of public life and subject them to a logic of efficiency and control (Habermas 1987: 130).

This "colonization of the life world" stems, according to Habermas, from systematically distorted communication. It thus suppresses the natural communicative potential for problem-solving in a society. For him, a rational discourse takes place only if participants can express their intentions truthfully, sincerely, and with the aim of reaching genuine understanding. Such a discourse seeks to coordinate human action by means of consensus arrived at through rational argumentation (Ahearn 2000). Habermas argues that public participation contains the potential for the "revitalization of buried possibilities for expression and communication" (1981, p. 33) and that public deliberation is the most promising way to arrive at rational outcomes in which the "unforced force" of the better argument prevails (Habermas, 1984).

The two notions of the rationalization of the life world and its colonization by the subsystems of the system create an interesting reference frame when they are applied in the context of river restoration and to the main issues in this thesis. River corridors can be perceived as being located at a potential life-world system interface. This could be true in two respects – due to the different affected spatial scales (e.g. river corridors as residential environment and recreational space of local communities versus risk zones of catchment systems) and involved rationalities (people's shared structures of meaning versus functional rationality of economic and state actors).

This raises the question of whether river corridors refer more closely to the realms of the life-world or to those of the system, and also whether all actors in the negotiations to do with river

restoration share the same interpretation. Should river corridors turn out to have close life-world ties, it would be interesting to trace the associated rationalization tendencies and examine whether traditional norms or more communicative processes of negotiated meanings play a role today. If river corridors are indeed part of people's life-worlds, then these river spaces will play a role in reproducing and regulating meaning. This means policy makers and planners will need to understand the aspects of meaning people assign to river landscapes and take them into consideration when planning river restorations.

Applying the Habermasian theoretical framework to river restoration projects leads to the question whether a "colonization" of the life world by the system could occur when restoring rivers. This could be the case if the cantonal and federal offices, which are part of the sub-system "administration", implement local restoration projects in a top-down manner without seeking and finding appropriate ways of involving all affected stakeholders. This, in turn, leads to the question of stakeholder identification: which stakeholder groups should be able to participate in planning and deciding on river restoration projects and how they should be involved in the planning process?

Current river restoration practice frequently uses a scheme of stakeholder identification that is derived from a theory developed by Mitchell (1997). According to his so-called "stakeholder salience model", which stems from the field of business management, only those stakeholders who have legitimate and urgent claims, as well as the necessary political power to cause conflicts and to hinder or block a given project should become involved[2] (see Junker et al. 2007, Ejderyan et al. 2006).

According to Habermas (1981), involving powerful stakeholders is sufficient if conflict prevention or, more generally, functional integration is the main objective (as in the fields of economy and policy). If the life-world is concerned, however, direct or communicative participation is needed for healthy social development and a functional democratic state. He argues that, if this is missing, the local population will become increasingly alienated from their everyday landscape because identification processes, socialization and social integration will be inadequate (Buchecker et al. 2003; Pickup et al. 1998; Weichhart 1990; Volker 1997). Alienation could also happen with river restoration.

This issue of which actors should be included in a deliberative discourse is closely connected to another question within the Habermasian framework, namely how to arrive at the most rational (i.e. sustainable[3]) outcome for river restorations. Critiques of Habermas have claimed that if decision-making is more democratic, it will not necessarily be ecologically rational and in line with expert objectives (e.g. Sköllerhorn 1998; Mason 1997). It is therefore also an aim of this thesis to find out whether public interest and expert-based ecological objectives for river restorations diverge, overlap or conform, i.e. whether a common ground can be found between the two.

The Habermasian approach with its theory of communicative action (1981) has been an important influence on debates around the societal negotiation of decisions in urban (Ahearn 2000) and spatial planning (Muggli 2001; Selle 1996; Innes 1995), and technological impact assessment (Renn and Webler 1998; Hager 1993). This perspective is taken in this thesis and

[2] This theory is similar to the ‚normative' approach to participatory policy as described by Fiorino (1989) and Stirling (2006).

[3] It can be argued that rational decisions at a collective level are at the same time sustainable due to the assumption that it would be most rational (in the sense of prudential, reasonable or acting in its own interest) for a society to live in a sustainable manner (see also Geiser 2001; Watts and Pett 1996).

views participatory processes in natural resource management and landscape planning, including river restorations, differently from previous studies (e.g. Zaugg Stern 2006), and applies what could be called a public participation, or bottom-up, approach. It focuses on involving local residents, communities, associations and non-governmental organizations in planning tasks that are coordinated and implemented by cantonal and federal offices. In contrast, an institutional, or top-down, participation research approach (as it might be called in this context) focuses more on participatory negotiation at the level of political institutions and on the implementation of policies (see e.g. Zaugg et al. 2004, Zaugg Stern 2006, Ejderyan et al. 2006). Figure 1 gives a schematic overview of these two main perspectives.

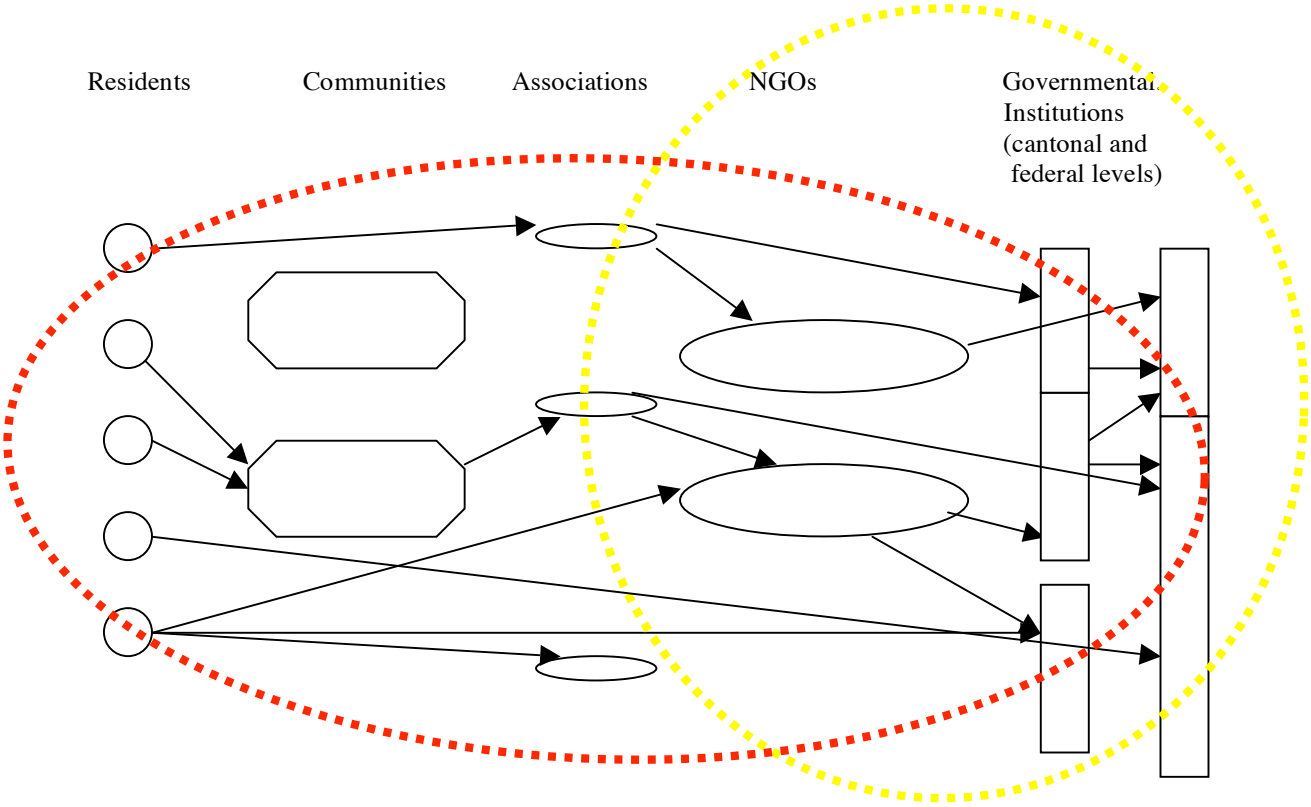

Fig. 1. Schematic overview of public participation versus institutional participation approaches (red line: public participation approach; yellow line: institutional participation approach); NGOs=Non-Governmental Organisations (source of scheme: M. Buchecker).

1.5. Central research questions

Extensive investigation of the theoretical and empirical state of the art in regard to the larger field of interest of this research revealed certain gaps and led to specific research questions. The four research papers that form the basis of this thesis deal with these questions in detail (see part II). Nevertheless, they particularly focus on the following two overarching research aims.

The first main aim of the research is to explore the *social aspects of river restorations* (see also section 1.3.). However, the previous discussion of river restoration and of the underlying theoretical approach has shown that social objectives coexist with ecological/hydrological and economic objectives and need to be balanced in a sustainable river landscape development.

Therefore, a second aim of this thesis was to examine whether there is a conflict between the social and these other objectives, and how a *balance between the objectives of sustainability for river restorations* can be found.

The examination of these two overarching research aims led to further more specific questions. These included where, according to the theoretical approach adopted (see section 1.4.), river landscapes can be located in the interface between the life-world and systems world. Therefore the first set of questions was:

a1. What meaning do local residents, the wider Swiss public and organized stakeholders[4] *assign to river landscapes?*
a2. What needs do river landscapes satisfy?

These questions were touched on in all of the four research papers, and it was one of the main foci of paper II.
The next questions had more to do with the conceptual context of public needs and claims. They can refer to the content of river management measures, such as planning recreational infrastructure in a project perimeter or to the procedural aspects, such as involvement in the decision-making in river restorations:

b1. What are the claims of local people and the Swiss population in regard to the design of river restorations?
b2. What are their claims in regard to participating in river restoration projects?

Research papers I and II both dealt with this topic, while the findings of paper III relate to the first part of this question.
Since public attitudes can be rather instable over time, it remains an aim of this research to examine their underlying structure. Therefore, another question is:

c. What factors influence public attitudes towards river restorations?

This question was the central topic of research paper IV.
As outlined in the theoretical approach section, critiques of Habermas have claimed that public objectives and attitudes toward a given subject are not necessarily in accord with expert objectives. This opens up an area of conflict between the social and the environmental objectives of sustainability. Can a balance between the two be found? If so, what would rational decisions taking into account social objectives look like? To explore these broader questions, we related them to our study and asked:

d. Do water management experts and local people / Swiss public tend to have different objectives for river restorations?

This was the subject of research papers I, II and III.
The demand for a sustainable management of rivers and their restoration, which we can understand as a balanced incorporation of social, economic and environmental objectives, leads to the question of which actors should be involved in the decision making processes of projects and how? The final questions were, therefore:

[4] For a definition of the term „stakeholder“, especially in demarcation to „local residents“, see sections 2.3.1. and 2.3.2.

e1) Which stakeholder groups should be involved in planning and deciding on river restoration projects?
e2) Which public participation strategies are most appropriate in achieving at the same time ecological and social objectives for river restorations?

These questions were dealt with directly in research papers I and II, and indirectly in papers III and IV.

1.6. Overview of research papers and publication details

The main part of this thesis consists of the four research papers listed below that are reproduced in full in section 3. They all underwent or are undergoing a double-blind peer review process, and the first publication has been published as part of an anthology. The research papers II-IV were submitted to international scientific ISI journals. Paper II and III have already been published, while paper IV is currently under review.

I. Junker, B., and M. Buchecker (2007), Social science contributions to the participatory planning of water systems – results from Swiss case studies. In: Castelletti, A. and Soncini Sessa, R. (eds.) *Topics on system analysis and integrated water resources management*, Elsevier, Oxford. Pp. 243-255

II. Junker, B.; Buchecker, M., and U. Müller-Böker (2007), Social relevance of river restorations: which actors should be involved in decision-making? *Water Resources Research 43(10)*: W10438, doi: 10.1029/2006WR005584: 11p.

III. Junker, B., and M. Buchecker (2008), Aesthetic preferences versus ecological objectives in river restorations. *Landscape and Urban Planning, 85, 141-154.*

IV. Junker, B., Buchecker, M., and J. Frick (submitted), What influences public attitudes toward river restorations? *Society and Natural Resources.*

I have co-authored further papers and publications within the framework of the "Rhone-Thur Project". These draw on my findings and develop practice-relevant guidelines for assessing the quality of river restorations and for designing appropriate participatory decision-making strategies for river restoration projects. Since they may be of interest, they are listed below but are not explicitly further discussed in this thesis:

- Woolsey, S., Capelli, F., Gonser, T., Hoehn, E., Hostmann, M., Junker, B., Roulier, C., Schweizer, S., Tiegs, S., Tockner, K., Weber, C., and A. Peter (2007), Assessing river restorations: indicator selection based on project objectives. *Freshwater Biology* 52(4), 752-769.

- Hostmann, M., Buchecker, M., Ejderyan, O., Geiser, U., Junker, B., Schweizer, S., Truffer, B., and M. Zaugg Stern (2005), Wasserbauprojekte gemeinsam planen. *Handbuch für die Partizipation und Entscheidungsfindung bei Wasserbauprojekten*. Eawag, WSL, LCH-EPFL, VAW-ETHZ. (can be found also under: www.rivermanagement.ch). 48 pp.

- Woolsey, S., Weber, C., Gonser, T., Hoehn, E., Hostmann, M., Junker, B., Roulier, C., Schweizer, S., Tiegs, S., Tockner, K., and A. Peter (2005), *Handbuch für die Erfolgskontrolle bei Fliessgewässerrevitalisierungen*.

Publikation des Rhone-Thur Projektes. Eawag, WSL, LCH-EPFL, VAW-ETHZ. (also under: www.rivermanagement.ch). 112 pp.

- Buchecker, M., Kianicka, S., and B. Junker (2006), Value systems: drivers of human landscape interactions. In: Kienast, F., Ghosh, S. and Wildi, O. (Eds.). *A Changing World. Challenges for Landscape Research*. Landscape Series Vol. 8, Springer, pp. 17-36

- Junker, B., and M. Buchecker (2008), S*ozialverträgliche Flussrevitalisierungen - ein Leitfaden*. WSL/Mava Stiftung für Naturschutz.

2 Research procedure

In this section I outline the general research approach taken in this thesis and provide an overview of the methods used in the different research phases and in the specific research papers. The research sites, sampling procedures and collected data are briefly described, with more detailed descriptions in the different research papers. The focus here is on explaining the main research procedure and methodology used. These could not be described in detail in the research papers due to space limitations.

2.1. Research approach

Modern river engineering practice in Switzerland is complex. Recent decades have seen a major shift in the philosophy of river management practice (Zaugg Stern 2006; section 1.3. in this thesis). A range of objectives relating to different fields of meaning and policies need to be taken into account in river restoration projects. Moreover, these projects affect a wide spectrum of stakeholder groups with different interests, which adds to the complexity. Further, different spatial and institutional scales may be relevant in examining the social aspects of river restoration projects, for example, public attitudes towards a particular local project could differ from public attitudes toward river restorations in general.

To do justice to this complexity, multiple triangulation was chosen as the principal overall study methodology. Triangulation (Denzin 1978; Lamnek 1988) is also appropriate here as the qualitative methods allow a deeper understanding of the issues and the development of hypotheses (e.g. through interviews and observations). These hypotheses can be tested and relevant aspects can be quantified in a standardized way (e.g. through surveys). Triangulation can thus overcome the weaknesses or intrinsic biases of single methods and data sources (Herbert and Shepherd 2001).

The triangulation approach I used deals with a variety of aspects to do with the complex situation outlined above. Denzin (1970) distinguishes between data triangulation and methods triangulation.

I used data triangulation to take into account the temporal aspect. In this case, this meant examining two case studies, one during the pre-implementation or planning phase of a river restoration project (case study I) and the other in a post- implementation phase of another river restoration project (case study II). Data triangulation here also referred to the groups of people interviewed and surveyed in the different research phases, including: members of the local public in the two case study areas, organized stakeholder groups involved in deciding on the restoration projects, project managers, water engineering experts and the wider Swiss public. Data triangulation was further applied with respect to geographical location. Case study one examined a concrete local project along the River Thur in Canton Thurgau, while case study two studied a restoration project in a very different geographical setting along the Rivers Flaz and Inn in Canton Grisons. Finally, two surveys were carried out Switzerland-wide. A further data triangulation aspect was built into the design of these Switzerland-wide surveys. The more comprehensive version of the survey was sent out as written questionnaire, so a lower response rate was expected. A shorter version of the same questionnaire was used for more time-limited phone interviews, where there is normally a higher response rate (see section 2.3.3. for more details).

Method triangulation also comprised several aspects. First, the basic methodological approach differed in the specific research phases. The first case study was the first research phase, so I used a purely exploratory, inductive approach. The findings of this first research phase served as the basis for the initial hypotheses. Case study two was a comparative study in the second research phase, which followed a mixed inductive/deductive approach. That is, while the research was still open to new insights, the hypotheses derived from case study one could be tested in the different context of case study two. Both of the case studies served to develop refined hypotheses as well as actual questionnaire items and scales to be used in the third, deductive research phase when the Swiss public was surveyed (for an overview, see Figure 2).

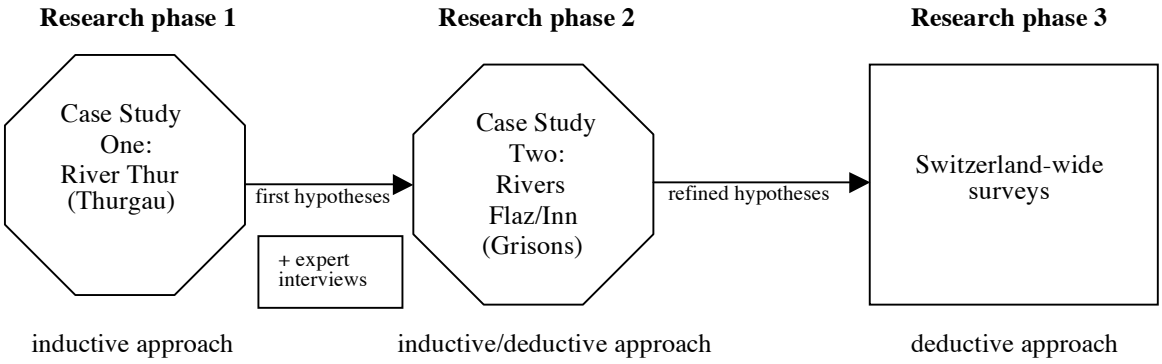

Fig. 2. Overview of the different research phases used in this study

The triangulation of methods refers not only to the use of different methods in the research phases 1, 2 and 3, but also to the mix of quantitative and qualitative methods used within the two case studies, as described in more detail in section 2.2.

Finally, the mix of methods used in triangulation and the different types of data gathered meant that different approaches and perspectives could be considered in investigating the research questions. For example, we obtained not only a local discursive perspective on negotiating river restoration objectives, but also a more geographically abstract, thematic perspective. The case study research provided locally relevant insights, while the Switzerland-wide surveys shed light in a more general and abstract way on river restorations in general. The surveys were also designed to explore at the same time people's attitudes toward river restorations and the factors behind them on a local scale (river restorations in their own area or neighborhood). The data gathered in this way could be compared with the findings of the case studies, i.e. data triangulation was used here. The design of the Switzerland-wide survey also involved a kind of method triangulation since the same sample of respondents was used. While the verbal question parts of the surveys served to obtain information on both a general geographical level and the locally relevant level, a photo scenario test provided an additional visual perspective on the research topic (see section 2.2. for more detail).

2.2. Case study sites*

2.2.1. Case study I (River Thur, Weinfelden/Bürglen)

The first case study focused on an area along the River Thur between the town of Weinfelden and the village of Bürglen in North-East Switzerland (Canton Thurgau). This area has approximately 12,400 inhabitants and is a typical agricultural region. The River Thur is a large river (average discharge volume of water: 40 m^3/s), which is 127 kilometers long and flows through five cantons.

In the process of the first Thur correction (1874 – 1893), the appearance of the 43 km long river section of the Thur in the Canton Thurgau was altered drastically. The river was channeled, dams were constructed and a double profile for the river corridor was created. The idea was to have wide stretches of alluvial land between the actual riverbed and the dams, which could serve as run-off areas should water discharges exceed medium levels (see Figure 3).

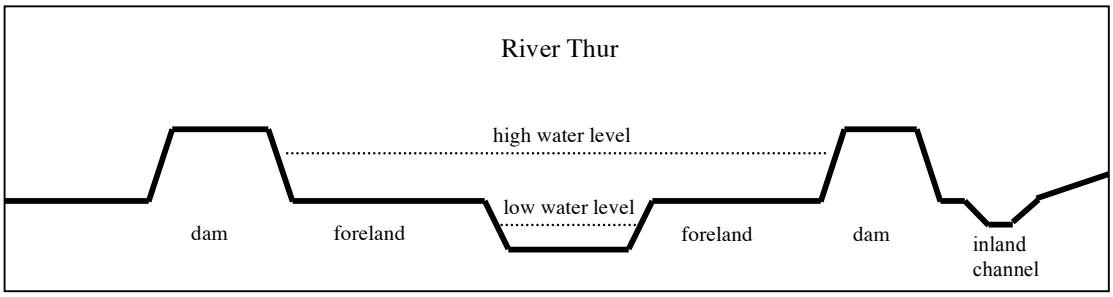

Fig. 3. Schematic overview of the double profile of the River Thur (source: Zaugg Stern 2006, based on Baumann 2002).

While the alluvial land was previously used mainly extensively (mills, wickerwork, pastures), from the 1960s on it has been worked more and more intensively (Zaugg Stern 2006). The levels of some of the areas was raised and were thus less frequently flooded.

A second Thur correction was launched in 1979 after disastrous floods in 1977 and 1978. Its guiding principle was "The alluvial stretches along the Thur belong to the river." (Zaugg Stern 2006). It aimed to provide appropriate flood protection and to protect the ground-water reservoir, as well as agriculture and forestry in the Thur valley. In meeting these goals, it was specified that due consideration should be given to nature protection, fishing, irrigation, waterpower production and recreational uses of the river.

The philosophy behind Swiss water-engineering practices had already changed by the 1980s (as described in Zaugg Stern 2006). Even stronger momentum for changing policies in this area came from a statement of principle in 2001 signed by officials from all five Thur cantons which called for a sustainable development of the river corridor (Thurkantone and BWG 2001). The document specifically emphasized the need for there be sufficient space for the river so that near-natural river processes could be restored and biodiversity thus increased. The aim to combine flood protection with environmental restoration measures, complies with the Swiss Federal Law on Hydraulic Engineering (Schweizerische Eidgenossenschaft 1991).

In 1999, the project team from the Thurgau Office for the Environment (AfU Thurgau) started to develop plans for a large river project. By January 2000, the project team had drawn up an

* The case study description is to some extent similar to or identical with the descriptions in research paper II (Junker et al. 2007).

initial project scheme (as shown in Figure 4). The project team set three main goals: 1) to increase the level of flood protection for the specific area as well as for the whole River Thur system; 2) to widen the river and carry out ecological restoration, including improving eco-morphological quality; and 3) to construct a retention basin.

Fig. 4. Initial scheme for the River Thur project in the Weinfelden-Bürglen area (source: Baumann, AfU Thurgau)

Several flood protection and restoration projects along the River Thur have already been carried out (e.g. in Frauenfeld, Gütighausen, Niederneunforn). Some of these projects were controversial and the different interest groups often had conflicting opinions, the agricultural lobby, environmental organizations and the Federal Office for the Environment, (Zaugg 2002, Zaugg Stern 2006). The managing team for the river project Weinfelden-Bürglen made an effort not only to involve various federal and cantonal offices in planning this project, but also to facilitate a public participative decision-making procedure. Accordingly, a committee was set up in 2003 to monitor the project, consisting of several cantonal and federal offices for water engineering, the environment, agriculture, forestry and fishing. Two years after drawing up the first project scenario, the project team also established a so-called regional working group consisting of invited representatives of several stakeholder groups (agricultural users of land along the river within the area covered by the project, land-owners, the regional Farmers Unions, fishermen, hunters, the gravel industry, supra-regional environmental NGOs, Office of Tourism Weinfelden, and the mayors of the boroughs affected).

Several factors made this project along the River Thur a good choice for the first case study. First the River Thur has an interesting history and the project provided a rare chance to observe the planning and decision-making processes involved in such a project from the beginning. Moreover, I was already in contact with the managing project team when I started the dissertation within the framework of the Rhone-Thur project (see section 1.2.). I was kindly allowed to attend the managing team's project meetings and the workshops of the regional working group.

2.2.2. Case study II (Rivers Flaz/Inn, Samedan)

The second case study was carried out along the Rivers Flaz and Inn in the community of Samedan in the Engadin region (South-East Switzerland). The Flaz drains the area around the Piz Bernina and has a rather steep gradient. In Samedan (2000 inhabitants), it joins the River Inn, the main river of the Engadin valley. Here, an encompassing project involving both of these rivers started in 1999 and ended in 2004. All the planned measures were finally implemented in 2006 (Figure 5). In contrast to the Thur project, the Flaz/Inn project in Samedan had thus already been successfully completed when the case study was conducted.

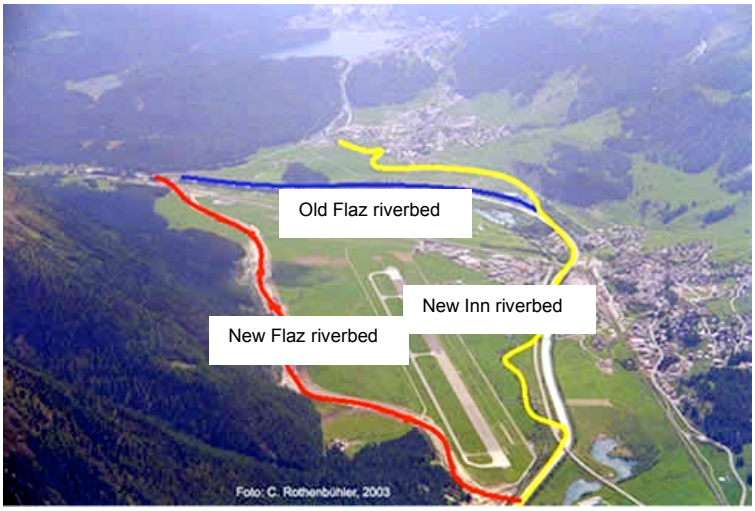

Fig. 5. Aerial view of case study area Flaz/Inn (source: C. Rothenbühler).

The Flaz/Inn project has a varied history. After a flood event in 1987, the project was initiated by Canton Grisons initially to focus on flood protection measures. But the local authorities saw no need to pursue either flood protection or a restoration project in the region at the time. The Canton reacted (in 1997) by declaring substantial parts of the area to be a high-risk flood zone so that no new building could take place in this area. In reaction to this measure, Samedan's local council decided to develop a variety of project scenarios in cooperation with the cantonal offices and federal research institutions. Several of these scenarios included ecological rehabilitation aspects. After the community voted against all the more expensive restoration scenarios and for purely technical flood protection in 1997, a potential restoration project was halted. A new mayor was, however, elected in 1998. He took a personal interest in and saw the advantages of such a river restoration and openly invited everybody interested and potentially affected to work on further river scenarios. He also explicitly invited outspoken opponents of the restoration project scenarios to participate.

A regional working group was then launched (led by the mayor), as well as an ecological monitoring committee. The regional working group consisted of representatives of: farmers, residents of Samedan and local industry. The ecological monitoring committee was made up of stakeholders from: the cantonal hunting and fishing offices, the Grison Cantonal Office of Environment, ornithologists, environmental organizations, local residents and fishing/hunting groups. These two working groups, in cooperation with the Grison Cantonal Office for Civil Engineering, worked out several scenarios, ranging from purely technical flood protection schemes to combinations of flood protection and, to varying extents, ecological restoration measures.

Throughout the entire planning and decision-making process, the local public was continuously and very openly informed via the monthly community newsletter. Further, the mayor established weekly office hours to answer local inhabitants' questions. Samedan's citizens finally voted on a scenario proposed by the local council in the village assembly on June 15, 2000 and on credit for the project on Nov. 26, 2000. The proposed scheme was the maximum scenario, involving a dismantling of the dams in the area, a relocation of parts of the River Flaz and extensive ecological restoration measures along the new Flaz bed, along its old bed and along the River Inn in the community area. This scheme received the majority of votes (pro: 128; contra: 6). This scenario has since been implemented.

This case study site was chosen since it offered the possibility to do a retrospective study of a project where the planning and decision-making process had recently been completed. It was also an interesting study object as local public attitude's toward the project and the restoration objectives underwent a radical change, moving from strong opposition to the river project at the beginning to active approval of a comprehensive restoration in the end. Further, the way the managing project team facilitated widely inclusive public participation during the planning and decision-making stage provided excellent material for a case study to examine how such a participation approach could influence public attitudes toward a river restoration.

2.3. Research methods

2.3.1. Case study I (River Thur, Weinfelden/Bürglen)

As Figure 2 shows, a case study along the River Thur in the Canton Thurgau was conducted during the first research phase from fall 2002 to summer 2003. The planning and decision-making process for this river restoration project between the town of Weinfelden and village of Bürglen was still ongoing at the time of the study. I used inductive methods, carrying out qualitative interviews, and quantitative surveys, and observing the decision-making process. I applied as wide as possible ranges of methods and of stakeholder groups interviewed to obtain insights into the spectrum of issues involved. In the qualitative interviews I first explored the people-river landscape relationship and the social mechanisms of consensus-finding in the river project. The quantitative surveys were intended to produce empirical information on these topics. The observation of the decision-making process itself contributed a procedural perspective on the issues. These methods are described in more detail below.

The qualitative, explorative interviews were carried out according to problem-centered, semi-structured question guidelines (Bernard 1994; Berg 2001) with members of the local general public, stakeholders participating in the decision-making process and members of the river project team. Such semi-structured interviews allow the researcher to focus on the central questions, thus providing a fixed setting, but at the same time providing room for the interviewees to express their subjective views and opinions. I used a theoretical sampling approach to select the interviewees (Glaser and Strauss 1998). This approach does not aim at statistical representativeness, but at identifying the widest possible range of opinions "through the strategic consideration of variables or factors expected to produce variation in the phenomenon being studied" (Gustafson 2001, p. 8). This meant that, in the actual research that interviews were carried out until no more new positions emerged and no more new significant information could be gained, i.e. until a theoretical saturation was reached (cf. Kianicka et al. 2006).

A standardized questionnaire was designed on the basis of these qualitative interviews. It was used to survey all potential stakeholder groups, i.e.:

- local residents in the case study community (not organized; not actively involved in the local decision making process)
- organized stakeholder groups (not actively involved in the local decision making process), and
- organized stakeholder groups involved in the decision-making process (e.g. as members of the regional working group, see section 2.2.1.)

The methodological concept of addressing the term "stakeholder" for this local decision making process was based on a social science approach (Ejderyan et al. 2006) and Habermas' theory of communicative action (1981). It followed a descriptive approach to stakeholder identification, which is the question of who is involved in the decision making process and who is not (see Ejderyan et al. 2006, p.83), and sought to hold the spectrum of potential stakeholder groups as broad as possible.

Roughly half the survey involved closed and the other half open questions (see the questionnaire in Appendix B). To reach the local public, it was sent via the community newspaper to all of the households of Bürglen and distributed to pedestrians on several days a week at different locations within the community of Weinfelden between 7:00 a.m. and 21:00. The same questionnaire was sent by mail to all the stakeholder groups actually involved in the decision-making process for the River Thur project as participants in the regional working group (see also the detailed descriptions in research papers I and II). In order to survey those potential organized stakeholder groups that were not invited to participate in this concrete decision-making process, the local phone directory and the "snowball-principle", i.e. referrals from initial informants to other potential informants (Lubbell 2003) were used.

In addition to the qualitative interviews and the quantitative surveys, the decision-making process for the River Thur project was observed from September 2002 to September 2004 by attending the meetings of the managing project team and also the meetings of the official public participatory planning body, the regional working group. All minutes of the meetings were collected, as was all the information material issued for the public about the river project. Figure 6 gives an overview of all methods used in this first case study.

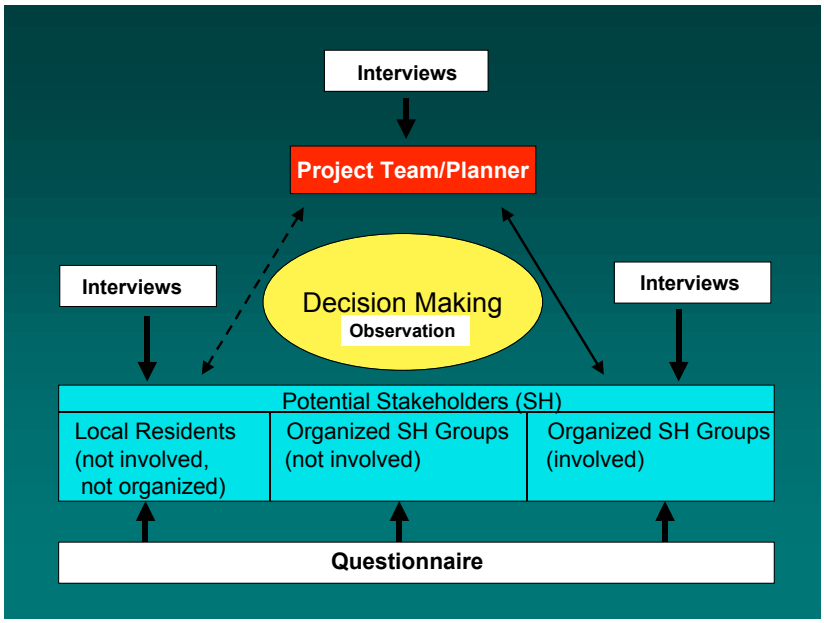

Fig.6. Overview of methods used in the River Thur case study

Interviews with water management experts from the cantonal and federal offices were also conducted.

2.3.2. Case study II (Rivers Flaz/Inn, Samedan)

In the second research phase, a further case study was conducted from spring to summer 2004. It was planned as a basis for comparison with the first case study and served to develop refined hypotheses, questionnaire items and scales that could be used in the final, representative Switzerland-wide surveys. Therefore, the same kinds of methods were used as in the first case study. One aim of the second case study was also to reconstruct the planning, decision-making and public communication processes of this project that had been officially finished by the time of this study.[5]

Guidelines for the qualitative interview questions were similar to those used in the River Thur case study, but were designed with the added aim of exploring retrospectively how public attitudes changed toward the project. It also took into consideration the qualitative hypotheses and aspects that had evolved from the first case study. As in the River Thur case study, local residents (not members of organized stakeholder groups), members of organized stakeholder groups who had been involved in deciding on the river project and members of the managing project team were interviewed using the theoretical sampling approach (Glaser and Strauss 1998) described in section 2.3.1. The qualitative part of this case study consisted further of collecting all minutes of the managing project team's meetings, and all the public information distributed on the project (leaflets, newsletters, posters, etc.).

Finally, a questionnaire to quantitatively survey the local population of Samedan was designed on the basis of the findings of the first case study and of the qualitative interviews in the second case study. It was sent via the monthly Samedan community newsletter to all households. Figure 7 gives an overview of the methods that were applied in this second case study (see Appendix C for more detail).

[5] Some restoration measures along the River Inn were implemented after the case study.

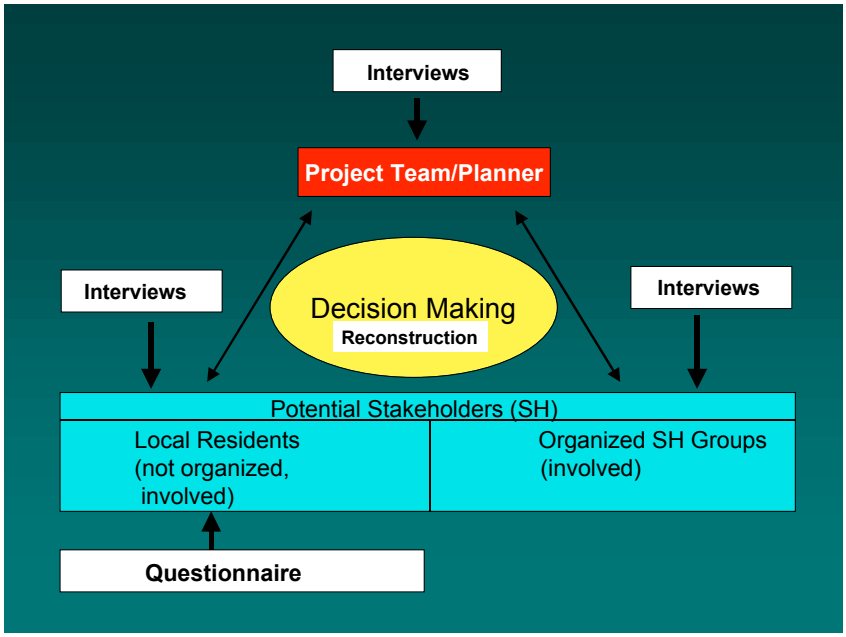

Fig. 7. Overview of methods used in the Rivers Flaz/Inn case study

2.3.3. Switzerland-wide surveys

In the final research phase the hypotheses and findings of the two previous case studies were empirically tested. It consisted of two Switzerland-wide surveys of the general population. One of them was sent out in the form of a written questionnaire, and the other involved standardized phone interviews. Both of the surveys contained mainly fixed response questions and were translated from German into the other two official Swiss languages (French and Italian). Both surveys were conducted from December 2004 to February 2005. The written survey consisted of a rather comprehensive questionnaire for which a response rate of approximately 30% was expected (Brody et al. 2005; Groot and van den Berg 2003; Ryan 2006 and 1998). The questionnaire for the phone survey consisted of a shortened version of the written questionnaire since the interviewing time was limited. As a trade-off, however, a higher response rate could be expected. The two surveys in combination served thus to maximize both the survey's width (written survey) and its inclusiveness (phone survey).

The written questionnaire included verbal questions with a photo scenario test in its center pages, while the shortened phone survey questionnaire contained only verbal questions (see Appendixes D and E). The questionnaires drew on the hypotheses of the two case studies as well as on Fishbein and Ajzen's theory of planned behavior (1980, 1975), various scenic landscape perception studies (e.g. Daniel 2001, Gobster 1994) and theories of attitude formation (e.g. Eagly and Chaiken 1998, Ajzen and Fishbein 1980, Bright et al. 2002).

The written survey was sent to a random representative sample throughout Switzerland drawn up by the Swiss Federal Office of Statistics (BfS) on the basis of the national register of Swiss residents with a phone extension. 4000 copies of the questionnaire were mailed to this sample, together with a cover letter and a stamped addressed envelope. A reminder was sent out 5 weeks later to those who had not responded by then. The response rate was 28.7%, which nearly reached the expected threshold of 30%.

The sampling for the phone survey was conducted following a random-quota procedure. That involved first a private market-research firm that specialized in large phone surveys drawing up a random sample on the basis of the Swiss national telephone book. In a second step, I identified strata for the age and gender and the proportions (or quota) in which they are represented in the whole Swiss population according to the most recent census data. The number of respondents was then limited according to these proportions. Altogether, the firm telephoned 5187 people with a response rate of 39%.

The following scheme gives an overview showing how many people were interviewed in the different studies, the response rates for each data-gathering step and how the data were used in the research papers I to IV.

Table 1. Methods used in the specific studies, number of interviewees, response rates and the data used in the paper publications

Study	**Qualitative data**	**No.**	**Quantitative data**	**No. of surveyed persons**	**Response rate in %**	**Data used directly in paper**	**Data used indirectly in paper**
Case study Thur:	Interviews: local public	10				**I and II**	**III and IV**
	Interviews: members of stakeholder groups involved	10				**I and II**	**III and IV**
	Interviews: project team	4				**I and II**	**III and IV**
			Survey: local public	215	57.7	**I and II**	
			Survey: stakeholder groups (involved and not involved)	166	59.3	**I and II**	
	Interviews: water management experts	4					**I - IV**
Case study Flaz/Inn:	Interviews: local public	6				**I and II**	**III and IV**
	Interviews: members of stakeholder groups involved	7				**I**	**III and IV**
	Interviews: project team	3				**I**	**III and IV**
			Survey: local public	340	17%		**I**
Swiss-wide:			Survey: phone	2016	39.0	**III**	
			Survey: written	1005	28.7	**IV**	

3 Synthesis of findings and discussion

As this thesis is intended to be accumulative, I will not elaborate on the central questions described in section 1.5. in detail. The four research papers present more specific, focused and detailed information on different aspects relating to these central questions. Nevertheless, this synthesis attempts to bring together and to discuss the findings of all four papers and relate them to these overarching questions.

3.1. The social aspects of river restorations

First, this thesis aimed to examine the social aspects of river restorations and to find out more about:

1) the meaning of river landscapes for the local and the Swiss public and the needs they satisfy.

The findings indicate in general that river landscapes are a significant part of people's everyday environment and that they have a high social meaning. They show that people's relationships with local river landscapes have a more pronounced life-worldly character than a functional one.

Most rivers in Switzerland, including the rivers in the two case studies, have a relatively long history of human engineering and modification. Therefore, it was surprising to find that river reaches are so strongly associated with people's living space and significantly less with functional spaces. The living-space dimension has according to a principal component analysis (see paper II), to do with the meaning of river landscapes as recreational and ecologically valuable spaces and as spaces important for local identity. Aspects characterizing river stretches as functional spaces include their economic use, the actual and perceived flooding risks and rivers as channels for water drainage.

The way people use and relate to river corridors is also indicative of their high social meaning. The results of the studies on both the local and the Switzerland-wide level showed that people make intensive use of river reaches for recreation and leisure activities. They also tend to feel strongly attached to rivers and show a high level of concern for restoration projects on rivers nearby.

These findings, especially that people associate rivers with their living spaces and much less with functional spaces, can be interpreted as meaning rivers belong to the actively used everyday landscape making up part of people's life world (in Habermas' terminology). This local life world is then affected when these areas are changed. This strong relationship of people to rivers confirms the former empirical findings of Tunstall et al. (1997), Zube et al. (1982) and Gloor and Meier (2000). Following Habermas' (1981) line of interpretation, the integration of local river reaches in the realm of the life world implies that these areas are carriers of social meanings for local inhabitants and that they identify with them. Therefore, local residents not involved in the decision making are likely to experience external planning interventions in river restorations as an intrusion of the system, imposing the logic of the state administration. Accordingly, if local views and needs are not taken into consideration, people will be less likely to identify with this changed everyday landscape and will feel less responsible for it (Buchecker et al. 2003). This could then lead to their further alienation from their local life world.

I have also explored the social aspects of river restorations in this thesis by examining the questions:

2) *what are the claims of the (local and the wider Swiss) public in regard to the design of river restorations and what are their claims in regard to participating in projects.*

In general, I found the public had a positive attitude toward river restorations, which is in line with previous studies (WWF 2003; House and Fordham 1997, Fordham 1991). Here the findings showed that improving the naturalness in and along the rivers is a very clear wish for many of the respondents. At the same time, there is a relatively high interest in becoming involved in planning and deciding on river restorations.

As the representative surveys showed, attitudes toward river restoration in Switzerland that combines flood protection measures and ecological rehabilitation of river stretches seem to be very positive. In the nation-wide survey, 85% of respondents were in favor of such projects in general, and slightly fewer (75%) in favor of projects in their own neighborhood and of restoration projects where ecological rehabilitation is the main objective. A majority, however, still favoured pure restoration projects (without specific flood protection measures): 61% for Switzerland as a whole and 55% for their own region.

In part of the written nation-wide survey respondents were asked to rate photo scenarios depicting different degrees of restoration said they preferred restored river scenarios with respect to both vegetation and river morphology. That is, photos showing more space for the river, with a meandering channel, gravel banks, creeks and other such features were considered more desirable. However, an interesting finding here was that it made statistically no significant difference to public preferences whether the river stretch in the scenarios was restored to the highest level or only to a medium level of eco-morphological quality.

How natural the respondents perceived the scenarios to be was highly correlated to how much they felt a scenario would satisfy their needs. The principal components factor of these two aspects – perceived naturalness and perceived satisfaction of needs – explained, among the other hypothesized influences, by far the largest proportion of the variance in aesthetic preference. This suggests that the need for more naturalness in and along the rivers is central to public (aesthetic) preferences and thus also to public attitudes toward river restoration endeavours (for more detail, see research paper III). However, even though there is a strong relationship between naturalness as people perceive it and expert judgements of ecological integrity, there are some differences as well. These need to be taken into consideration when examining the relationships between expert and public objectives for river restorations (see section 4.2.).

Public recreation needs in and along rivers were also examined in this thesis. The qualitative and quantitative case studies showed clearly that the local rivers are favoured spaces for recreation and leisure activities. According to the written and phone surveys, the most preferred activities all had to do with the naturalness of the river corridors (in descending order of frequency: walking, observing nature, relaxing, BBQing, and biking/cycling). Obviously, the perceived naturalness of the river corridor also influences recreation activity preferences. Surprisingly, visible infrastructure for recreational and leisure activities had no overall significant effect on public aesthetic preferences for restoration scenarios in the photo test, which is contrary to the hypothesis and to previous research findings (Zedler and Leach

1998; Tahvanainen et al. 2001; Booth 2005). A positive difference between scenarios with and without infrastructure could only be found for those depicting the lowest eco-morphological level, i.e. the unrestored situation. This finding must be interpreted within the context of a photo survey, where people probably first make a purely aesthetic assessment when rating photos of landscapes they are not familiar with. It can be assumed that recreational and leisure activities tend to be less important in influencing preferences in a photo survey (depicting scenarios of an unknown river), whereas they would probably be more relevant if respondents were asked to judge river restoration scenarios locally and on site.

A generally positive attitude toward a river project with restoration measures could also be found in the River Thur case study, while public attitudes toward a river project along the Rivers Flaz and Inn underwent a major change during the planning process. The inhabitants in the River Thur case study area indicated a need for action to make the local river space more natural and to offer better recreational opportunities. Unlike respondents in the River Thur case study, the inhabitants of Samedan (case study II) were at first strongly opposed to a restoration project along the Rivers Flaz and Inn. This initial objection was transformed during the planning process into strong public approval of the finally implemented river restoration scenario along the rivers. This transformation was possible partly as a result of external factors, such as state subsidies for a river project that included comprehensive ecological restoration measures, but also because the local authorities used a widely inclusive participatory decision-making strategy with intensive communication of project potentials and objectives.

The findings also showed that there is considerable public interest in becoming involved in planning and deciding on river restorations. As the Switzerland-wide surveys showed, the Swiss public in general seems to be keener to participate in the restoration process than people in the case study regions. Participation forms that required more personal effort and time (e.g. attending workshops or working group meetings) tended to be rated differently according to whether they should just be available or whether respondents would personally make use of them (more than 10% difference in rating). As could be expected, this difference amounted to less than 10% for participation forms with a considerably lower effort-threshold (e.g. attending information events with discussions, public surveys or votings). An unexpected result, however, was that people seem to think it as important to have a say in river restorations as it is in local land use planning (see research paper II).

A common argument against including the public more widely in planning is the apparent lack of willingness of locals to participate in planning and decision-making in natural resource management (Syme et al. 1993; Mostert 2003). Other authors have argued that the reason for the low level of public participation is not a lack of will, but rather a lack of appropriate forms of participation (Buchecker et al. 1999, 2003; Gessenharter 1996). The people interviewed in this study mostly want to participate in river restoration projects, as Tunstall et al. (1997) and others have also found. In the phone survey 96% of the respondents said they wanted to have some sort of say in planning and deciding on local river restoration projects, but fewer said they would personally participate. Still 60-70% thought they would participate in information events where they could discuss issues, participate in a survey, and vote on several project scenarios or on a final project scenario.

People tend to find it easier, however, to express a commitment to be involved in a hypothetical river restoration project in their region than to participate in the planning of an ongoing project such as the Thur case study. There, 79% of the respondents indicated that

they wanted to have some sort of say in the planning and decision-making process, while when it came to specific concrete forms of involvement only 38% said they would want to choose between project scenarios, 32% they would share in ideas for the project and 28% they would vote on a final project. The data thus indicate that the expressed need for involvement is not the same as the actual commitment to act accordingly. This finding is in line with those previous studies that found a gap between expressed willingness to participate and actual participation behavior (Leigh 1989; Buchecker 1999, 2003; Frick et al. subm.; Gregory et al. 2000).

Even if the response rate is taken into account, a relatively high percentage of residents would still agree to engage in active forms of public participation such as collaborating in workshops (Thur case study: 16%; Switzerland-wide phone survey: 35%) and work groups (Thur case study: 19%, Switzerland-wide phone survey: 33%). This suggests people feel a strong sense of responsibility for their local river landscapes, similar to that felt for local land use and regional landscape development planning measures where the need to become involved has also been found to be high (according to the Switzerland-wide written survey). This further corroborates the life-world character of river landscapes.

To gain a better understanding of the underlying structure of public attitude toward river restorations, another issue I looked at was:

3) *the factors that influence public attitudes towards river restorations.*

The two case studies led to a variety of hypothesized factors that could have an effect on how the Swiss perceive river restorations. The empirical test of these hypotheses showed that not all of these factors were very strong predictors. An interesting finding, however, was that cognitive factors (personal value orientations, perceived outcomes of river restoration, and the meaning of river stretches), emotional factors (emotional responses to former projects and personal relationships with rivers) and behavioral factors (activity in environmental protection) play a role in forming public attitudes toward river restorations. These findings are in accordance with previous studies on the factors that influence how the attitudes to different attitude objects are formed (Bright et al. 2002; Vaske and Donnelly 1999; Anderson 1991; Bright and Manfredo 1996). A further important finding was that social and procedural factors (e.g. perceived social risks, subjective social norms or satisfaction with previous decision making in one own community) also play a significant role in forming people's attitudes to river restorations.

Different factors seem to explain positive attitudes and negative attitudes toward river restorations. The subjective social norm for appropriate attitudes toward river restorations as a social factor, and people's general satisfaction with the decision-making culture in their community, as well as perceived procedural barriers as procedural factors tended to influence most respondents with negative attitudes and to have less affect on those with positive attitudes. The same is true for perceived risks of flooding (see research paper IV).

Surprisingly, public evaluations of the risks of flooding did not influence attitude formation much in the nation-wide survey (full sample and positive attitude models). This is contrary to previous studies of the effect of perceived risks on attitude formation (Tunstall et al. 2000; Lima 2006; Dramstad et al. 2001), but in accordance with the case study findings here. People close to the Rivers Thur and Flaz/Inn did not perceive there to be any great need for action to improve flood protection. People tend to perceive rivers as less risky for flooding than water engineering experts often assume. As the River Thur case study clearly showed,

an explicit communication of project objectives for flood protection is needed. Locals often think only about the local need for flood protection, while water project managers have in mind not only local, but also, and often more importantly, systemic flood protection strategies (see research paper I).

For the exploration of the social aspects of river restoration on a more general level, my findings outlined so far indicate that river restoration projects involve very complex social issues with differing local contexts. The great efforts required in earlier decades in terms of money and human resources to modify, to channel and to master rivers are still present in many people's minds. However, the rather recent re-orientation in river management seems, in principle, to be welcomed by the majority of people, and the long-term trend seems to be to view such projects very positively. This process of positive attitude formation should not be confused, however, with the finding of previous studies that, after restoration projects are implemented, people will soon accept them even if there were conflicts during the planning phases (Bratrich 2004; Knall 2006; Gloor and Meier 2000). Incorporating those social and procedural factors, I found to be relevant in the planning of river restorations, is likely to lead to "active" public approval. However, post-project habituation of the public to changes in local river landscapes might be considered rather a kind of "passive" resignation.

My findings clearly indicate that river restoration measures tend to affect people's everyday landscapes and the life-world meanings and functions they attach to them. This happens regardless of earlier interventions in these areas by the (water management) expert system (cf. Zaugg Stern 2006) and the authorities. The norms for the use and further development of the river areas, however, are no longer defined by a traditional allocation of meanings. A modernization process according to Habermas (1981) seems to have taken place that relies instead more on a communicative negotiation of meanings. This would mean that a deliberative discourse based on the principles of ideal speech, as set out by Habermas, is needed in order to pursue the principles of sustainable landscape development.

3.2. Balancing the different objectives of sustainability for river restorations

The social dimension has to be developed together with the ecological, hydrological and economic dimensions in the sustainable development paradigm. Another aim of this thesis was, therefore, to examine whether there is a conflict between the social objectives and the other objectives, and in particular whether:

4) *water management experts and the local and wider Swiss public tend to have different objectives for river restorations.*

This study revealed in general a rather strong correspondence between water management objectives and public objectives regarding the future of river reaches, regardless of the methodological approach used, including in the local case studies and the visually oriented photo test survey.

The photo test in the written Switzerland-wide survey showed an especially strong overlap between experts' objectives for river restorations and those of the general public, particularly with respect to ecological objectives. Respondents rated river scenarios with more eco-morphological quality also aesthetically higher. Scenarios with even a small increase in the restoration level of eco-morphological quality were perceived as much more attractive than unrestored scenarios. Surprisingly, very extensive restoration measures led to only very slight increases in aesthetic evaluation compared with only medium measures. The most prominent

factor influencing people's aesthetic preferences was how natural they perceived river stretches to be (see research paper III), which correlated more strongly than did aesthetic preferences and expert judgments of what would be desirable in terms of the eco-morphological integrity of rivers.

The substantial overlap between public preferences and experts' objectives – in contrast to the objectives of the involved stakeholder groups – was also found in the verbal question parts of the case study and of the Switzerland-wide surveys. Where there were marked differences between expert and public objectives, such as at the onset of the Flaz/Inn river project, a widely inclusive participation approach appears to be the most promising way to communicate restoration objectives and to gain public support. This leads thus to the question:

5) which stakeholders should be involved in planning and deciding on river restoration projects.

Public preferences and river management objectives tended, I found, to correspond to a high degree. A comparison between the surveys of the general public and of representatives of the stakeholder groups directly involved in deciding on a river restoration, however, showed differing profiles. Locals tended to emphasise improving recreational quality and naturalness as project objectives. Stakeholders were more likely to stress protecting economic use of the land along the riverbanks. In general, the public in both case study regions had a more positive attitude towards restoration projects than the materially affected stakeholder groups (farmers, land-owners).

These findings show clearly the need to distinguish between the different groups affected by river restoration measures (cf. Ejderyan et al. 2006). Some stakeholder groups are materially affected by the associated land-use interventions (farmers, land-owners, industry), while other stakeholder groups are rather ideally affected (e.g. environmental organizations). Another group consists mostly of those locals who use the river stretches and who are affected in terms of life quality, recreation and identity. Historically it is rather recent for this feeling of being affected in terms of life quality to be officially recognized. It is, however, closely linked to the objective of sustainable landscape development.

Involving organized stakeholders (Farmers' Unions, environmental NGOs etc.) and local officials is currently often assumed to be the best possible water management practice and to be a progressive management scheme. In this thesis, I found, however, that involving the wider public, especially recreational users, helps in implementing far-reaching project objectives, and in achieving of better quality decisions. These are frequently opposed by local land-owners and land-users. Other authors in previous studies have also claimed that widely inclusive participation increases the quality of decision-making (Beierle and Cayford 2002; Gee et al. 2001; Coenen et al. 1998). I also found that broadly based public inclusion in participatory river restoration planning seems to promote other social objectives besides conflict avoidance, such as increasing the identification of locals with their everyday living space and their feeling of responsibility for it. Only if such objectives are also met, can Swiss river restoration planning be said to conform with the goals of comprehensive sustainable landscape development (Buchecker et al. 2003).

Another question addressed in this thesis was:

6) which public participation strategies are likely to be most appropriate in implementing the ecological and social objectives of river restorations.

Analysing the planning and decision-making processes in the two case study projects greatly helped in determining the most relevant issues and in contributing to a new "best practice" in participatory river restoration planning. For example, the analysis showed that what motivates project management to employ participatory planning influences the success of the project. Involving stakeholders for the sole reason of satisfying legal guidelines and to reduce conflict will very likely be perceived as an "alibi" exercise and lead to increased opposition. In this context, it was also found to be important to clearly define "participation rules" for project objectives that can or cannot be negotiated and also for the rights and duties of the stakeholder groups involved.

The findings of the Thur and Flaz/Inn case studies, similar to those of other studies (e.g. Zaugg Stern 2006, Camenisch et al. 2000, Knall 2006), show how important it is to design a participation scheme from the very beginning of a project. The social, cultural and economic context of a river project must be carefully evaluated. Such a context analysis would preferably include social survey methods to gather information on local preferences, needs and issues of concern, which could then serve as a basis for all further planning measures (cf. Hostmann et al. 2005, Junker and Buchecker 2008).

The main question I was interested in is whether attaining a balance between the social objectives and the other objectives of sustainable landscape development is feasible for river restorations. The findings indicate that incorporating social objectives into the planning of river restorations need not go against the objectives of water management experts and authorities. The notion of social objectives used includes more than just avoiding social conflict and striving for (post-project) public acceptance. It also aims at achieving social learning, increasing trust between the public and the expert system and authorities, social integration and active approval of these landscape changes. Thus it also promotes increased public responsibility for their local environment.

As the results show, putting social objectives on the active working agenda of river restoration planning and decision-making tends to even promote ecological objectives. This contrasts with some theoretical arguments (Sköllerhorn 1998; Mason 1997) and the frequent concerns of water management practitioners. However, not involving stakeholders that are affected by river restoration projects in terms of quality of life, recreation and identity increases the risk of conflicts. Communicative action and active negotiation, involving a widely inclusive discourse between experts and all affected stakeholders, including the local public, is needed to prevent people perceiving a restoration as an intrusion into the local everyday landscape which is their local life-world. This is likely to promote the development of active public support for river restorations rather of just passive public habituation to the restored local river corridors.

Several benefits could arise from recognizing the life-worldly character of local river landscapes and strengthening the communicative interaction between the life-world and systems-world in planning and deciding on river restorations. One is that it could encourage particular stakeholder groups to take seriously not only their own (life-worldly) needs, but also increase their appreciation of existential, system-world objectives (e.g. systemic flood protection, and ecological restoration). Taking life-worldly matters seriously would, in this

sense, imply also taking seriously system-worldly matters and thus revitalize the interface between the life-world and systems-world. Promoting a widely inclusive discourse between experts and all affected stakeholders would be the most promising strategy to ensure rational decision-making that favors a holistic, and thus sustainable, river landscape development.

4 Conclusions for river restoration practice and further research needs

The findings described here hold several implications for river restoration practice. First, the fact that people seem to have strong life-wordly ties to river corridors means it is important to incorporate a thorough analysis of the context into the first planning phases of river restoration projects. Aspects of the meaning these river spaces have for the people living there can be identified through local surveys, which can have, at the same time, a variety of further functions. For example, surveys can be used to: identify potential stakeholder groups; gain an additional local source of knowledge (Junker and Buchecker 2007); inform the local public about a new river restoration project (House 1996; Beierle 1998); and involve locals in planning and decision-making (Duram and Brown 1998); or establish a pre-project measure for monitoring the project that can be compared with a post-project measure (Woolsey et al. 2005; Gloor and Meier 2001). Actively acknowledging and taking into account the life-worldly character of the local river corridors in river restoration projects can thus have various benefits for the project management.
A standardized exemplary questionnaire containing items that cover the relevant information based on a comprehensive context analysis could be part of a Decision Support System (DSS) software specifically designed for river restoration projects (Hostmann et al. 2005; Junker and Buchecker 2008).

My findings further show that people in Switzerland seem to be generally in favor of river restorations. They indicate that the preferences of the (local) public tend to be closer to the project managers' aims than to those of the stakeholders involved in the decision-making process (case study Thur, see Junker and Buchecker 2007). This means that including the public in planning and decision-making is likely to increase support far-reaching restoration goals rather than jeopardize them. It also implies that if the only stakeholders who are involved are those who are organized and materially affected, as recommended by Mitchell (1997), there is a danger of over-representing stakeholder interests (e.g. those of local land-owners and farmers' unions) that oppose restoration aims (cf. Zaugg et al. 2004). Involving the local public could also weaken the potential resistance of a materially affected minority of stakeholders and thus lead to more realistic project solutions based on a more representative range of interests.

Involving organized and materially affected stakeholders appears to be sufficient to avoid conflicts, but an extended range of stakeholders (e.g. local recreational users) still needs to be consulted because, as I found, river restorations affect the local living space of the local population. To ensure for social sustainability, the objectives of public participation should be more long-term and far-reaching than merely conflict prevention. These objectives include promoting a sense of local self-determination and responsibility for the local environment and increasing the identification of the locals with their changed everyday living space (Buchecker and Kienast 2003; Weichhart 1990), increasing trust between the public and the authorities, and fostering a social learning process promoting future participation as well as environmental protection (Beierle 2000; Pahl-Wostl 2002; Mostert 2003; Beierle and Cayford 2002).

These social objectives could best be accommodated if project managers offer stakeholder groups a variety of ways of becoming involved in planning and decision-making, as other authors have also recommended (e.g. Gregory 2000; Moote 1997). They might best be served by including the wider public in the first planning phase, as Lubell (2000) and other authors have suggested. Specially designed instruments for public participation could be expedient here, such as advisory committees, planning cells, future scenarios, public surveys, public

value forums and citizen reports (Beierle and Cayford 2002; Gessenharter 1996; Keeney et al. 1990). More concrete recommendations drawing on my research findings were published in the practice-oriented handbook "Wasserbauprojekte gemeinsam planen. Handbuch für die Partizipation und Entscheidungsfindung bei Wasserbauprojekten" (Hostmann et al. 2005). A further detailed practice-oriented publication based on these findings has been produced as "Sozialverträgliche Flussrevitalisierungen – ein Leitfaden" (Junker and Buchecker 2008). It aims to delineate the new "best practice" for planning socially sound river restoration projects.

When broad public involvement is promoted, it is often objected that river projects entail aspects that are not negotiable, such as the implementation of federal policy guidelines for both flood protection and restoration objectives (BWG 1991). It is therefore important to point out that project managers need to define clear limits to public participation, and specify the range of existing interests that can be considered and which scenarios can be discussed. Such rules of the game are also needed to explain the rights and duties of all participants as actors in a participatory planning and decision-making process.

More research in this area is, of course, still needed. My research findings allow me to make general recommendations for river restoration practice in terms of how public participation could be accommodated in planning and deciding on river restorations. However, further research would be helpful to examine how effective and efficient different forms of public involvement are (Beierle and Cayford 2002). Research schemes using a pre-/post-measurement method appear very promising, as initial experiments in landscape planning have shown (Gehring et al. 2004; Buchecker and Hunziker 2006; Halvorsen 2003). It would also be of interest to find out more about how public participation could be actively encouraged. We also need to empirically test the effects of public participation on other social objectives besides conflict avoidance, as outlined above, such as increasing trust in the local, cantonal and federal authorities, enhancing people's identification with their local living space and their responsibility for it. Further it would be meaningful to extend the photo scenario survey we used and design a discrete choice experiment in which several restoration scenarios could be tested and compared. Future research is also needed to examine the economic costs and benefits of participatory planning, as until now only very general conclusions have been drawn without testing them empirically.

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Part II: Research Papers

Paper I

JUNKER, B.& M. BUCHECKER (2007)

Social science contributions to the participatory planning of water systems – results from Swiss case studies

In: Castelletti. A. & R. Soncini Sessa (eds.) Topics on System Analysis and Integrated Water Resource Management. Elsevier.

Chapter 15

Social Science Contributions to the Participatory Planning of Water Systems - Results from Swiss Case Studies

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1. Introduction

Participatory approaches to decision-making in water systems planning have gained worldwide a novel significance in Integrated Water Resources Management (IWRM, see GWP [2000] and [Mostert, 2003])). They are also an important objective of the European Water Framework Directive (WFD - Directive/2000/60/EC [European Commission, 2000]). This is one of the main reasons that there exists besides the engineering and natural sciences a strong call for social science research and expertise to find and facilitate suitable strategies of public involvement and consensus finding [Creighton, 1981; Pahl-Wostl, 2005; Ridder *et al.*,2005]. One special area of water systems planning for which this is especially true is the area of river restorations. Large and numerous river restoration projects are currently carried out throughout Europe and in many other parts of the world [Boon *et al.*, 1994]. River restorations are today expected to combine improved flood protection measures with the ecological rehabilitation of the river reaches. This chapter contributes to social science research for new 'best practise' in participatory planning of water systems by means of two case studies on river restoration projects in Switzerland. Here the Federal Law on hydraulic engineering [BSE, 1991] explicitly calls for measures combining flood security and an ecological revalorization of the river spaces [BWG,2001]. The guideline of the Swiss Federal Ministry for Water and Geology (BWG) for theses measures puts also much emphasis on the social components of such river projects, such as their acceptance by the local public and stakeholders, their participation in the planning and decision-making process, as well as possible compensation measures for affected land

owners/users. In order to gain more knowledge on the different aspects of river rehabilitation, a large transdisciplinary research project - the so called Rhone-Thur project[1] - was initiated by the BWG, the Federal Ministry for Environment, Forest and Landscape (BUWAL), the Swiss Federal Institute for Environmental Science and Technology (EAWAG) and the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) in 2001. Besides research on engineering and natural science aspects of river revitalisation, also such social science aspects as decision-making, consensus building and participation are studied. Part of this endeavour is the research project "Objectives of the population in regard to river restoration[2]". Results of this study can contribute to the design of participatory planning for river rehabilitation projects.

While the implementation of computer-aided decisional procedures are helpful for an efficient planning and decision-making process, we argue that the careful evaluation of the social, economic and cultural context of each river project and the design of the participation and consensus finding process are also of high relevance for the success and finally for the acceptance of such projects [Gregory, 2000; Tunstall *et al.*,2000]. Important factors are identified that - according to the results of the concrete project cases studied - should be helpful for successfully implementing (and carrying out) a participatory and decisional process for larger river restoration projects.

2. Research design

2.1. Methods

The results for this contribution stem from qualitative and quantitative data gained in two case studies at the River Thur (river section between Weinfelden and Bürglen) and Flaz (Samedan). The consensus and decision-making process for the Thur project is still ongoing and is negotiated between the river restoration project team from cantonal offices as well as organised stakeholder groups. The same process has already successfully been finished for the Flaz project and here also the local population has been involved next to the project team from canton and community and organised stakeholders. Qualitative interviews along a question guideline were carried out with members of the local population in the respective areas, of involved organised stakeholders and of the project teams. Furthermore, standardised questionnaires were distributed via the community

[1]For more information see: http://www.rhone-thur.eawag.ch, last visit 05/2006.

[2]See also the project homepage: http://www.wsl.ch/land/society/prorenat-en.ehtml, last visit 05/2006.

newspapers to all of the households in Bürglen (Thur) and in Samedan (Flaz) and to a random sample of street passengers in Weinfelden (Thur). In the first case study (River Thur), the consensus and decision-making process itself was observed and a questionnaire given out to the participants at the beginning and later at the end of this process.

While the first case study on the River Thur was carried out in an explorative way, the gained data was used to derive first hypotheses that established the base for the second case study at the River Flaz. After reworking the hypotheses again from the further data of the second case study, they will be tested by means of a representative Swiss-wide survey[3]. This mix of methods allowed for a triangulation of methods which is especially suited to the subject of this study since it offered the chance to first obtain a deeper understanding of the issues at stake (by means of interviews and observation) and then to measure and test the general occurrence of certain phenomena (by means of the questionnaires) [Denzin and Lincoln, 1994; Lamnek, 1988; Backhaus, 2000] . At present, both case studies on the Thur project have been completed.

2.2. Study Areas

Thur (Weinfelden/Bürglen)

The first case study focused on the area between Weinfelden and Bürglen at the River Thur in the Northeast of Switzerland (Canton Thurgau). There the river project team from two cantonal offices for the environment (AfU Thurgau) plans a large river project with the objective to combine flood protection with a river widening and a retention basin. This project is part of the 2^{nd} Thur correction that was started after disastrous floods in 1978 [see Baumann, 2002]. Having initiated the project by proposing a first drawn-up sketch of a project scenario the planning team established a regional working group in order to facilitate a participatory decision-making procedure. This circle consists of invited representatives of the following groups: land owners and land users of the affected project perimeter, gravel industry[4], fishing and hunting organisations, regional Farmers Union, Weinfelden community office of tourism, and the mayors of the affected communities[5].

In a basic information meeting the project team introduced the following planning actions: a river widening, a retention basin and the restora-

[3]Conducted between December 2004 and February 2005.

[4]Currently, gravel is worked along the project perimeter. Widening the river bed would produce large amounts of gravel as well.

[5]The mayor of the community Bürglen was asked by the project team to lead the regional working group.

tion of the existing dams. Given these main actions, the participants were given the possibility to negotiate the action space between these framing conditions. The participants where asked to draw up and to explain their own project alternatives (coherent mix of planning actions) in the second meeting. These were supposed to be the basis for the further negotiation process.

At the second meeting there existed relatively strong opposition of some members of the regional working group against the project proposed by the project team[6]. Participants felt that the participatory decision-making process was only an alibi exercise of the project team. There existed also misunderstanding about the issues of flood protection and the retention basin. The landowners also criticised their lack of concrete information on compensation measures for their land. Since some of the misunderstandings could be erased by the project team, the third meeting indicated some willingness of the participants to find a consensus among the differing claims. At the same time a petition was launched by a member of the regional Farmers Union complaining at the highest cantonal instance about a missing wider participation and discussion of this project, thus discrediting and criticising the project team for the design of the participation process.

Flaz (Samedan)

In contrast to the Thur project, the Flaz project in Samedan in the Engadin region (Southeast of Switzerland) has already been successfully carried out. After a flood event in 1987, the project was initiated by the canton of Grisons initially centring around the necessity of flood protection measures. But the municipal council and the community actually perceived no need of pursuing a project in this region at that time. The canton reacted by declaring substantial parts of the community ground a high-risk zone thus preventing any new construction in this area. These measures caused the municipality in cooperation with the cantonal offices and federal research institutions to develop a variety of project alternatives. Several of these alternatives included ecological rehabilitation aspects. After a voting of the community against more expensive restoration actions and for a purely technical flood protection project in 1997, a new mayor came to power in 1998. The new mayor of Samedan personally saw the advantages of a rehabilitation project and openly invited everybody interested in and affected by a possible project to work on further project alternatives. Also here a regional working group was launched (lead by the mayor) - together with an additional ecological accompanying commission. These two groups,

[6]These were mainly the representatives of the land owners and users.

in cooperation with the responsible cantonal office (Grison Cantonal Office for Civil Engineering) and other cantonal offices, produced three practicable project ideas. Finally the members of the community Samedan voted on one alternative favoured by these groups. This was the maximum alternative, comprising a dismantling of the dams in the area, a relocation of parts of the River Flaz and ecological restoration measures along the new Flaz bed as well as the River Inn in this area[7].It received the majority of votes. This alternative has been implemented by now.

Decision-making procedures at Thur and Flaz: Neither for the Thur nor for the Flaz projects a computer-aided decision-making procedure was implemented and several of the phases of the PIP procedure by Castelletti and Soncini-Sessa (see Ch. **??**) were omitted. Table 15.1 indicates which phases were employed or missing.

3. Social factors for an integrated and participatory decision-making procedure

Each water systems and thus also each river rehabilitation project is embedded in a specific social, economic and cultural context. The river spaces concerned play often not only a substantial role as a recreational and leisure time area for the local population in the respective area, but they are for most cases also in agricultural or other economic use [Green and Tunstall, 1992]. The necessary acceptance of a project and its efficient realisation depend therefore on the understanding and involvement of the local public and the relevant specific stakeholders [Gregory and Wellman, 2001].

The qualitative and quantitative data gained in the two studied projects at the Rivers Thur and Flaz clearly indicates the importance of

- a careful evaluation of the local setting (socio-economic and cultural context),
- a conscious consideration of social and communicative factors, as well as
- a circumspect design of the participation and consensus finding process

when planning and implementing the decision-making procedure for such a project. Therefore we argue that the phase Reconnaissance (Phase 0, Ch. **??**) should be given especially high emphasis. In what follows several factors that often play a crucial role for the success of a decision-making process - according to the results of the case studies on river rehabilitation projects - will be identified and described.

[7]For more information on the project see: www.flaz.ch, last visit 04/2006.

Table 15.1: Overview of the phases of the PIP procedure (see Ch. **??**) employed/not employed in the Thur and Flaz projects.

Phase	Thur project	Flaz project
0: Reconnaissance	"YES" (hydrological, geological + social surveys; definition of the project teams' strategic objective)	"YES" (hydrological + geological surveys; definition of the project teams strategic objectives)
1: Defining Actions	"NO" (not systematically)	"YES"
2: Defining Criteria & Indicators	"NO" (not systematically)	"YES"
3: Identifying the Model	"NO" (not systematically)	"NO" (not systematically)
4: Designing the Alternatives	"YES" (as proposed by the involved stakeholders)	"YES"
5: Estimating Effects	"YES"	"YES"
6: Evaluation	"NO" (not systematically)	"YES"
7: Comparison	"NO" (not systematically)	"YES"
8: Mitigation & Compensation	"YES"	"YES"
9: Final Decision	"NO" (open at present)	"YES" (proposal of the project team, voted on by the community)

3.1. The socio-economic and cultural setting of a project

The importance of the specific local context and setting for a given river project is often underestimated. In case a project team fails to correctly evaluate the different aspects that characterise the locality, the implemented planning and decision-making process bears a high risk of running into difficulties and in the worst-case scenario of failing altogether. Such cases are for example the projects Belpau and Bischofszell-Pfyn, as described by Camenisch *et al.* [2001] and Zaugg [2003], respectively. Therefore, the effort seems worthwhile to invest sufficient time and finances in pre-project evaluation of the socio-economic and cultural factors that establish the context for any river rehabilitation endeavour.

The following factors were found to be relevant in the two case studies:

- Current uses of the river space (economic use for agriculture, forestry,

industry, but also recreational uses^A, etc.).

- Meaning of the river space for local communities (other than concrete forms of use; perception, etc.)^A.
- Past restoration or similar projects in the wider area
- Possibilities and conditions for compensating dispossessed landowners in the project perimeter (financial recompense or land replacement options, etc.).
- Past flood events (and its effects).
- History of the river (time of channelling, etc.).
- Usability of agricultural land or forested land etc. in the project perimeter (also status of agriculture and forestry, etc. in the specific area^A).
- General climate in decision finding in the region (past experiences), i.e. relation to cantonal authorities, former conflicts, etc.)^A.
- Expectations of the affected communities/stakeholders in regard to their participation in the project^A.

Where the types of data marked by the superscript A can be obtained by means of a social survey in the pre-project (Reconnaissance) phase.

3.2. Social survey as a preliminary activity

In what follows motivations for executing such a survey before designing the actual decision-making and participation process are described. Social surveys can have the following variety of functions:

- to gain data for example on the meaning of the river space for the local population, the use of the area as well as the perceived need for action in the respective area [Junker *et al.*, 2003];
- to identify possible stakeholders [Mitchell, 1997; Grimble and Wellard, 1997];
- to establish a pre-project indicator measurement for a monitoring of the project that might be planned (to be completed with a post-project survey/measurement) [Woolsey *et al.*, 2005; Gloor and Meier, 2001];

- to serve as part of the overall public information strategy [House, 1996; Beierle, 1998];

- to explore the preferences of the local population and potential stakeholders in regard to their participation in the decision-making as a base for the design of this process (see Fig. 15.1);

- to serve as part of the participation process (people perceive a pre-project survey to a certain degree as a way of participating; the survey could for example come along with an invitation to the decision-making process) [Duram and Brown, 1998];

- to produce information that can later be used in the decision-making and consensus finding process as a mean of legitimisation and information.

In the next paragraphs we will describe an example for the last point in more detail and illustrate it with data from the Thur study. Knowledge of the perceived need for action of different groups in the respective area of concern can be not only very valuable for designing a tailored public relations strategy, but also relativise the magnitude of the respective stakeholders‘ claims in case that they differ from the majority‘s claims.

The assignment for the participants of the standardised surveys was to indicate whether they prefer to have done less, the same or more in comparison to the status quo for the different given aspects[8]. The reply of the local public in Weinfelden/Bürglen is shown in Fig. 15.2.

The same question was asked to the stakeholder groups actually involved in the decision-making process (see Fig. 15.3).

When comparing the data from the survey for the local population and the one for the stakeholders different trends in the preferences of these groups in comparison to the status quo can be identified, as shown in Tab. 15.2.

This information could be used in the consensus building process, as was confirmed by the qualitative interviews in Weinfelden and Bürglen. A few of the interview partners from the directly affected land users/owners indicated a higher willingness to cooperate by making parts of their land available to the project and/or by accepting the compensation offered by the canton as soon as they had knowledge of the majority‘s objectives.

[8]These aspects were identified to be the relevant ones for the planned Thur project by means of the qualitative interviews.

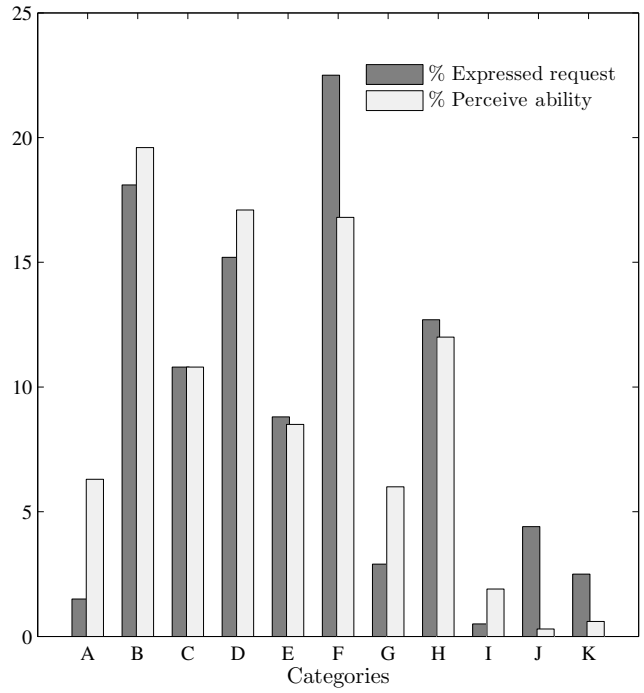

Figure 15.1: Expressed request versus perceived ability of the local population to participate in the planning process of the Thur project in Weinfelden and Bürglen. The categories considered are: A: *Taking initiative*; B: *Shipping in ideas* (*inquiry*); C: *Making proposals* (*workshop*); D: *Working out proposals* (*working group*); E: *Raising objections*; F: *Selection from different proposals*; G: *Veto*; H: *Voting on final project*; I: *Other*; J: *None*; K: *Do not know*.

3.3. Design of the information and participation process

Initiative to a project and communication of objectives

The majority of flood protection and river restoration projects in Switzerland are not initiated by the local communities, but by the responsible cantonal or federal office. Such an approach is not promising for an efficient realisation of the project since its continuation throughout the project

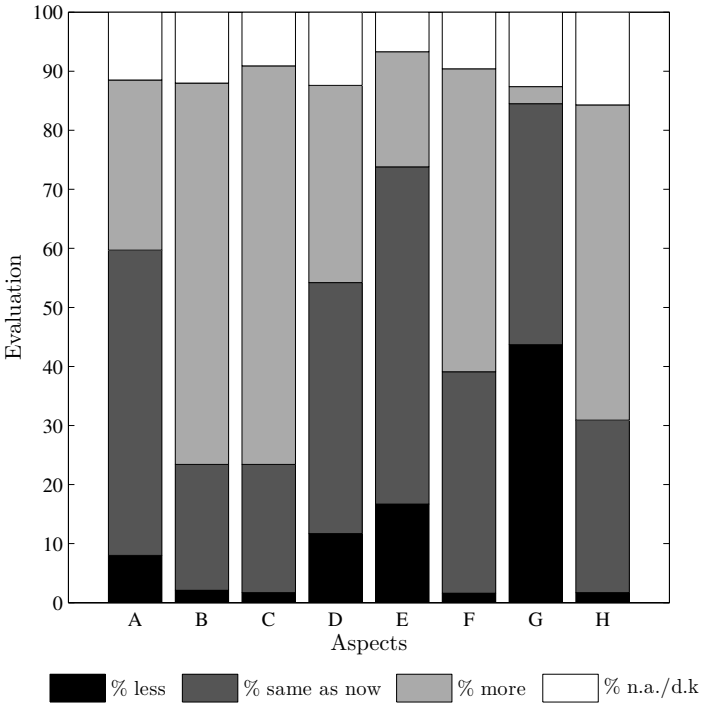

Figure 15.2: Perceived need for action of the local population Weinfelden/Bürglen (case study Thur). The aspects considered are A: *flood protection*; B: *water quality*; C: *naturalness*; D: *leisure time facilities*; E: *forestry*; F: *recreation*; G: *agriculture*; H: *ground water*.

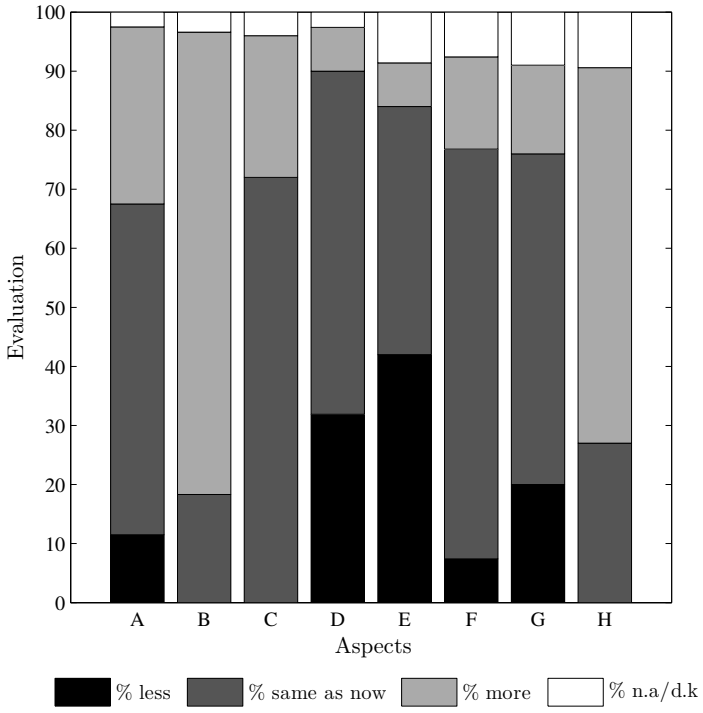

Figure 15.3: Perceived need for action of the stakeholder groups involved in the regional working group Weinfelden/Bürglen (case study Thur). The aspects considered are A: *flood protection*; B: *water quality*; C: *naturalness*; D: *leisure time facilities*; E: *forestry*; F: *recreation*; G: *agriculture*; H: *ground water*.

Table 15.2: Comparison of trends in perceived need of action.

Aspects	Population	Stakeholders
Naturalness	more	same
Forestry	same	less
Recreation	more	same
Agriculture	less	same

bears a high risk of failure due to a missing acceptance by the local public and stakeholders[9] Therefore it is of utmost importance that, once the initiative has been made, the communication and participation process is designed to change this top-down approach of planning into a bottom-up approach, or at least to combine these two in a way acceptable to all participants.

When having to launch a project in a top-down manner it further seems important that the project team clearly defines and communicates the necessities as well as the real motives of the project goals to the local public and the personally affected stakeholders. This has proven to be a problem for the Thur project. There a misunderstanding arose when the participants of the regional working group were told that the main goal of the project was flood protection for the project area. They did not recognize the necessity of implementing flood protection measures since the specific area is currently equipped for a safety level of an HQ100. On the basis of this evaluation some of the participants objected to the proposed project goal right from the start[10]. The local population did also not perceive of a high need for action in regard to an enhancement of flood security for the communities Weinfelden and Bürglen. Only 29% voted for more flood protection measures in this area, 56% indicated their wish to stay with the status quo[11]. Yet the canton's actual objective is not an improvement of the flood situation for the affected communities per se but a systemic flood protection along the River Thur within which the project measures in the project area are fully justified. As soon as this was communicated clearly by the cantonal project team, the involved stakeholders were suddenly ready to discuss a compromise and to engage in the consensus finding process.

Sufficient time for public participation

A further factor seems important when planning the information and consensus finding process for a given project. As seems to be the general consensus in the literature [Morrison, 2003; Beierle and Konisky, 2000 and Webler *et al.*, 2001] and as also the experiences from the Thur and Flaz projects show, not only a public relations and information strategy about a planned project and its objectives that starts as early as possible is key. It seems also decisive that sufficient time is calculated for the information

[9]See for example the failed restoration project Belpau [Camenisch *et al.*, 2001].

[10]Information from interviews with the participants of the regional working group and observation of the meetings of the regional working group Thur.

[11]Results from the questionnaire for the local population Thur project. See Fig. 15.2 for full information.

of the local public and directly affected stakeholders as well as for their participation in the decision-making process. This time factor seems to be of high relevance especially for the case of river rehabilitations since people living in the respective area are often highly used to the artificial nature of the river space. Thus, overcoming the status quo and recognising the value of a rehabilitation of the area can require relatively much time. Missing to schedule for a sufficiently long time span of the public participation process might result in the perception that this process is implemented solely for the purpose of acting accordingly with the federal guidelines and not for an actual contribution and exertion of an influence of the participating stakeholders to the decision-making. This by itself can prevent a successful course of the consensus finding process.

The Thur project was characterised by a very early start of the public information about the project idea, but late personal information of the affected land owners and users by the project team. While the local public seems to generally accept and approve the planned project, the late onset of communication in regard to the land use issue offered most of the land owners/users one more reason to block the consensus finding work creating thus an overall unfavourable climate for this process[12]. Once their mistrust had built about the fair proceeding of the project team, it was difficult to be erased. Yet enough time was assigned to the overall participation process in order to make up for this neglect and to establish more trust again during several meetings of the regional working group.

The Flaz project team pursued an early information and participation strategy towards both the community and directly affected persons assigning the overall communication and consensus-finding process sufficient length. The latter criterion played a crucial role for the outcome of the project since no need was perceived by the community to launch neither a flood protection nor a restoration project in this area at the beginning. This is partly due to the fact that the highly attractive landscape of the Engadin valley has additionally to its rivers a great variety of different prominent features in store. In contrast to the River Thur, which has a great prominence in the Thur valley of the Thurgau, the channelled and River Flaz prior to the project received only relatively little attention by the public. Here the overcoming of the status quo and the recognition of the potential of a revitalised river landscape needed a relatively long span of time that was sufficiently provided for by the project team[13].

[12] According to the results from the interviews, questionnaires and observations of the case study Thur.

[13] Results from the qualitative interviews with members of the project team, the working groups and the local population in Samedan.

Open invitation to the decision-making and consensus finding process.

One further question for designing the participation and decision-making process is who should be involved [Curtis *et al.*, 1995]. Here the experiences of the two researched projects strongly speak for an invitation that is as open as possible to everybody interested in contributing to this process, i.e. not only organized stakeholder groups. This includes also outspoken and potential critics of a project, since it forces them to not only face all other interests and perspectives on such a project, but it also ensures that the opposing standpoints are negotiated openly and not only outside the official consensus finding ground. I.e., the chances are higher that the different interests are negotiated within one communicative space under the auspices of the project team. A wide and inviting participation process further seems to be the base for the legitimization of the overall project while its neglect tends to offer opponents an argument for declaring a project illegitimate. If the local public can be involved the project team can in the best case furthermore profit from existing local knowledge that might be conducive to general project success. All of these points proved to be relevant in one or the other way in the Thur and Flaz projects. The invitation to participation in the regional working group in Weinfelden/Bürglen for example seems to have not been sufficiently open and wide enough. Only selected organized stakeholder groups were asked to participate while no invitation went to the local public and recreational user groups[14]. While these latter groups have not yet claimed their concrete participation, the Thurgau Farmer‘s Union has sent a petition as described above using the missing wider public participation as an argument for pushing their own interests in the decision-making process.

In contrast the project team of the Flaz project not only invited all community members to work on the project alternatives, they also offered the opportunity to vote on the resulting proposed alternative. While the alternative that included the largest restoration intervention faced much opposition at the beginning of the planning process, it gained a surprisingly high general acceptance at the end[15]. According to interview data, opponents to the finally realized project plan within the community of Samedan noticed their minority status and organised no further protest against the project.

[14] See Sec. 2.2 for the groups involved in the regional working group Thur.

[15] The community of Samedan voted on November 26, 2000 with 128:6 voices for the project scenario that was realized by now.

4. Conclusions

The implementation of computer-aided decision-making procedures for water system planning is without doubt an exigency for the planning and negotiation process of water systems projects. But the study of the river restoration projects at the Rivers Thur and Flaz clearly show that also a careful analysis and evaluation of the projects surrounding social, socio-economic and cultural contexts and settings is highly beneficial to this process. Social surveys among the respective local populations are one way of gathering the information needed for such an evaluation in the run-up of a concrete project. The data gained can serve multiple purposes at the same time, as for example for the identification of stakeholders to be involved, the clarification of the perceived need of action of different groups within the local population, or as a source of local knowledge of the respective area, to name here only a few. A standardised exemplary questionnaire containing items that cover the relevant issues of interests could be incorporated in a Decision Support System (DSS) software specifically designed for river restoration projects. This questionnaire could be complemented by a check-list enabling the project managers to ensure a consideration and evaluation of all typically relevant factors when planning a river restoration project. The utilisation of these tools could be seen as a basis for the subsequent design of an appropriate participation and consensus finding scheme, thus contributing to favourable preconditions for efficiently realising such projects as well as gaining the necessary public approval and support.

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Paper II

JUNKER, B., BUCHECKER, M. & U. MÜLLER-BÖKER (2007)

Social relevance of river restorations: which actors should be involved in Decision-making?

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Objectives of public participation: Which actors should be involved in the decision making for river restorations?

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[1] River restoration as a measure to improve both flood protection and ecological quality has become a common practice in river management. This new practice, however, has also become a source of conflicts arising from a neglect of the social aspects in river restoration projects. Therefore appropriate public involvement strategies have been recommended in recent years as a way of coping with these conflicts. However, an open question remains: Which stakeholders should be involved in the decision-making process? This, in turn, raises the question of the appropriate objectives of public participation. This study aims to answer these questions drawing on two case studies of Swiss river restoration projects and a related representative nationwide survey. Our findings suggest that public involvement should not be restricted to a small circle of influential stakeholder groups. As restoration projects have been found to have a substantial impact on the quality of life of the local population, avoiding conflicts is only one of several objectives of the involvement process. Including the wider public provides a special opportunity to promote social objectives, such as trust building and identification of people with their local environment.

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1. Introduction

[2] Rivers in many geographical regions of the world have been channeled and modified in the course of the last 150 years in order to prevent floods and to facilitate the economic use of the land along the watercourses. This process has caused a massive loss of riverine natural habitats and a drastic decrease in their biodiversity. The last few decades have, however, been marked by a paradigmatic shift in the practice of river engineering. River restorations are today expected to combine improved flood protection measures with the ecological rehabilitation of the river reaches. The planning and implementation of river restoration projects have, however, frequently proved to be sources of conflict. As a result, restoration projects have frequently been retarded or even averted [e.g., *Zaugg*, 2002; *Zaugg Stern*, 2006; *Camenisch et al.*, 2001]. This is due to the fact that most restorations imply a loss of the agriculturally or otherwise used land along the rivers. Resistance to restoration projects arises also from the tendency for local people to prefer the status quo (D. Gloor and H. Meier, Soziale Raumnutzung und ökologische Ansprüche, Grundlagen und Materialien, Professur Forstpolitik und Forstökonomie, ETH Zürich, Zürich, 2001, available at http://e-collection.ethbib.ethz.ch/show?type=incoll&nr=296), which may be associated with past achievements in river engineering as well as with the need for local self-determination.

[3] As a reaction to the social conflicts arising in this context, an increased implementation of participatory planning methods has been recommended [*Bundesamt für Wasser und Geologie* (*BWG*), 2001; *European Union*, 2000; *U.S. Congress*, 1969]. However, up to now there has been no consensus on which stakeholder groups should be involved in the planning of river restoration projects, on which principles stakeholder identification should be based [*Ejderyan et al.*, 2006; *Lubell*, 2000], or on which objectives of public participation would be appropriate. It is the aim of this paper to examine these questions.

[4] A range of general objectives for widely inclusive participation strategies in natural resource planning has been suggested. These objectives include their potential for increasing the public acceptance of decisions, reducing conflicts [*U.S. Department of Energy, Environment, Safety and Health*, 1998; *Dukes and Firehock*, 2001; *Susskind and Cruikshank*, 1987] and promoting trust in planning agencies [*Beierle*, 2000; *Beierle and Cayford*, 2002; *Schneider et al.*, 2003]. It is also claimed that comprehensive participation makes it possible to identify public concerns and values [*Creighton*, 1981; *Bauer and Randolph*, 1999; *Stirling*, 2006] and to use local knowledge [*Garcia-Zamor*, 1985; *Firorino*, 1990; *Raffensperger*, 1998], which can lead to better informed and more creative decision making [*Mostert*, 2003]. This would then improve the substantive quality of decisions [*Gee et al.*, 2001; *Coenen et al.*, 1998]. In this view public involvement represents a chance to promote not only environmental learning [*Beierle and Cayford*, 2002], but also to enhance local awareness of people's responsibility for the environment in which they live and to increase their identification with it [*Fordham et al.*, 1991; *Buchecker*, 1999].

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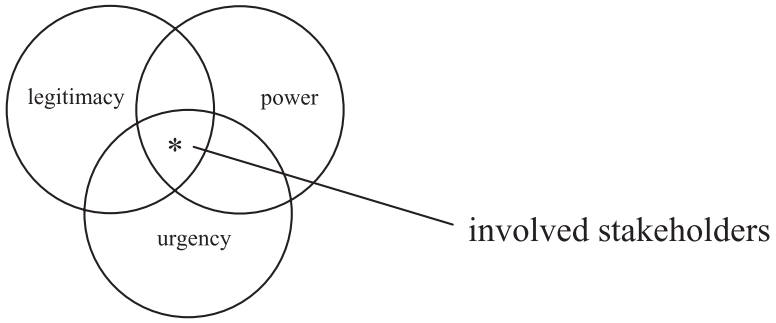

Figure 1. Identification of stakeholders according to *Mitchell* [1997].

Public involvement is further perceived as fostering social learning in the community [*Pahl-Wostl*, 2002; *Craps et al.*, 2003] and sustainable lifestyles [*Gallopin*, 1991; *Iyer-Raniga and Treloar*, 2000].

[5] However, are these claims of public involvement also recognized and put into practice in the context of river restorations? It is commonly acknowledged that involving stakeholders helps decrease conflicts in the planning of river restorations [*Duram and Brown*, 1998; *Beierle and Konisky*, 2001; *House and Fordham*, 1997]. River project managers, however, tend to perceive the risks rather than the potential benefits of the more far-reaching objectives of public involvement that go beyond conflict avoidance. Frequent arguments against extensive public involvement are, for example, lay people's lack of expertise [*Vining*, 1993] and of interest in participating [*Buchecker et al.*, 2003; *O'Riordan*, 1977]. More involvement in decision making is also frequently perceived as too complicated and expensive [*Mostert*, 2003], and there is concern that the public will make bad decisions [*Beierle and Cayford*, 2002]. Further, project managers often believe that they already know locals' needs and interests and can represent them, or at least the local community officials can [*Dearden*, 1981]. They tend to expect more inclusive public involvement in decision making to be detrimental to the particular project aims, especially to ecological restoration aims [*House and Fordham*, 1997; *Mostert*, 2003]. A further problem often raised is that the social and environmental aspects of sustainability might be mutually exclusive; that is, public involvement could prevent environmentally beneficial outcomes [*Sköllerhorn*, 1998; *Mason*, 1997].

[6] Because of these reservations about public participation in decision making, most project managers in Switzerland focus on conflict avoidance. Therefore they commonly use a scheme of stakeholder identification that entails the inclusion of established organized stakeholder groups in the planning process (e.g., environmental groups, regional farmers' unions, fishing and hunting organizations) or economically affected landowners within the project perimeter. Such schemes tend to exclude other groups from direct participation, for instance, local sports and recreational groups (both organized and unorganized), as well as the general local public beyond these groups. They are often excluded because they are thought to have only little political power and to be unlikely to cause conflicts [see also *Ejderyan et al.*, 2006]. These other groups are usually informed about the decision-making process, but not directly involved in it. This practice of stakeholder identification seems to be derived from a theory developed by *Mitchell* [1997]. According to this theory, which stems from the field of business management, only the stakeholders holding a critical level of legitimacy, urgency and power need to be involved in the participatory planning process (Figure 1).

[7] That is, only those stakeholders should become involved who have legitimate and urgent claims, as well as the necessary political power to cause conflicts and to hinder or block a given project. (This theory is similar to the "normative" approach to participatory policy as described by *Firorino* [1990] and *Stirling* [2006]).

[8] It is not well understood, however, whether this circle of involved stakeholder groups is sufficient in the context of river restorations, or whether a wider inclusion of the public would be desirable or even needed, as is increasingly the case now in landscape and village planning [*Buchecker et al.*, 2003; *Beierle and Cayford*, 2002; *Selle*, 1996; *Roux and Heeb*, 2002]. Apparently, which groups are invited to participate in the decision making of river restorations depends on the underlying objectives for public involvement. However, are there other desired objectives, besides avoiding conflicts, that are relevant in the context of river restorations?

[9] According to *Habermas*' [1981] theory of communicative interaction, which is widely used in planning theory, involving powerful stakeholders is sufficient if conflict prevention or, more generally, functional integration is the main objective. This is essentially the case in fields such as economy and policy. Fields, however, where social integration and identification have first priority can be attributed to the "life world," or in this case it might be better to say the "life space" of a community. In such fields more far-reaching objectives are relevant, and an extended public inclusion in participatory planning will be appropriate.

[10] Empirical studies confirm that interfering with people's living space without involving them leads them to become alienated, as well as to feel less responsible for changes in their everyday landscape [*Pickup et al.*, 2004; *Pfister*, 1997; *Pöttker*, 1997]. Public involvement, on the other hand, helps people to identify more with their living space and to strengthen social cohesion [*Weichhart*, 1990; *Buchecker et al.*, 2003; *Volker*, 1997].

[11] To clarify which objectives for public participation are relevant for river restorations and which groups of the public should best be involved in the decision making, we first have to understand the social relevance of river spaces. That is, we first need to find out if locals view river corridors only in a functional way or if they perceive them

Table 1. Methods Used in the Study

Qualitative Data: Interviews	Number	Quantitative Data: Survey	Response Rate, %
		Case Study Thur	
Local public	10	local public	57.9
Members of stakeholder groups involved	10	stakeholder groups (involved and not involved)	59.3
Project team	4		
		Case Study Flaz/Inn	
local public	6		
members of stakeholder groups involved	7		
Project team	3		
		Swiss Wide	
		phone	39.0
		written	28.7

to be part of their living space. Second we will have to investigate whether the stakeholders that are involved adequately represent local residents' values, aims and interests. Third, we will have to determine whether the wider public's interests might clash with the aims of project teams. On the basis of the answers to these questions, requirements regarding adequate inclusion can then be formulated.

2. Methods

2.1. Data Collection

[12] Research on the type of questions posed in this paper often relies mainly on qualitative case studies and less on quantitative empirical methods. Exceptions to this are the studies of *Beierle and Cayford* [2002] and *Lubell* [2000]. In this paper, we draw on the results of two case studies (including both qualitative and quantitative data collection methods) and of two representative surveys in Switzerland to answer these questions. This method triangulation [*Denzin and Lincoln*, 1994; *Lamnek*, 1988; *Backhaus*, 2001] was especially appropriate in this study since it offered an opportunity to obtain a deeper understanding of the issues at stake through interviews and observation, and then to quantify relevant aspects using the standardized questionnaires.

[13] The two case studies on Swiss restoration projects were carried out in the framework of restoration projects on the rivers Thur and Flaz/Inn. In both of these case studies we conducted problem-centered, explorative interviews using fairly open question guidelines with local people in each community, with the members of the project teams and with organized stakeholders who participate/d in the decision-making processes. All the interviewees were chosen on the basis of theoretical sampling [*Flick*, 1995; *Hunziker*, 2000].

[14] For the River Thur project, a questionnaire was designed on the basis of the qualitative research phase. This questionnaire was used to survey the local population of the case study community (Weinfelden), all potential stakeholder groups and those actually participating in the decision-making process. We distributed the questionnaire to pedestrians in Weinfelden several days a week at different locations within the community between 7:00 A.M. to 21:00 P.M. The same questionnaire was sent by mail to all potential stakeholder groups. The sample consisted of all stakeholder groups actually involved in the decision-making process for the River Thur as participants in the regional working group (see section 2.1 for the description of the case study "Thur").

[15] Some stakeholder groups were not invited to participate in this concrete decision-making process but could nevertheless have stakes in the future of the local River Thur corridor. To find these groups, we used the local phone directory and made extensive use of the snowball principle, i.e., referrals from initial subjects to generate additional subjects [*Lubell*, 2003]. Altogether, we sent out 280 questionnaires to members of stakeholder groups. For the River Thur project, we also observed the ongoing decision-making process itself (see section 2.1). All of the qualitative and quantitative data for the two case studies were gathered from fall 2002 to spring 2004.

[16] The qualitative and quantitative data from the two case studies were then used as the basis for designing a standardized nationwide phone survey. It contained mainly fixed-response questions and was translated into all three official Swiss languages (French, German, and Italian). Although we designed the survey, we appointed a private market research firm specialized in large phone surveys to actually conduct the phone interviews.

[17] The sampling for this phone survey followed a random-quota procedure; that is, first a random sample was made on the basis of the Swiss telephone directory. In a second step strata (in this case age and gender) and the proportions in which they are represented in the whole Swiss population were identified according to the most recent census data. Finally, the number of respondents was limited according to these respective proportions or quota. In terms of the content of the survey, questions covered topics to do with the meaning of the river corridors for the locals, their relationship with rivers, their use of the river corridors, their attitudes and their expectations in regard to the design of river restorations, as well as their active involvement in the decision making in such projects.

[18] Since a phone survey cannot be too long, we also conducted a written survey to include further aspects that were not covered in the phone survey, such as respondents' willingness to pay for restoration projects and the perceived importance of river restorations in comparison to other rehabilitation measures. This written survey was sent to a random representative sample throughout Switzerland drawn up by the Swiss Federal Office of Statistics (BfS) on the basis of the national register of Swiss residents with a phone extension. 4000 copies of the questionnaire were mailed to this sample, together with a cover letter and a postage-paid return envelope on 30 November 2004. Of these, 3500 were deliverable. A reminder was sent out after 5 weeks to those people who had not responded until then.

[19] All surveys used in this study were designed according to the Dillman protocol [*Dillman*, 1978, 2000], and they were all pretested before the actual survey was conducted. The nationwide phone and written surveys were carried out at the same time (December–February 2004). Table 1 gives an overview of the different qualitative, and quantitative, data collecting methods, and the respective numbers and response rates.

[20] All the surveys contained several questions on socio-demographic characteristics of the respondents (Table 2).

Table 2. Sociodemographic Characteristics of the Respondents (in%)

Age		Education	
Years	Respondents, %	Highest Level	Respondents, %
		Case Study Thur: Local Public[a]	
15–24	24.4	primary school	2.9
25–39	21.9	secondary	9.7
40–54	28.5	grammar school	10.5
55–69	18.7	apprenticeship/vocational school	39.4
>70	6.5	higher professional education	23.2
		university/college	14.3
		Swiss-Wide: Phone[b]	
15–24	14.3	primary school	1.5
25–34	19.0	secondary	8.5
34–54	40.6	grammar school	12.1
55–74	26.1	apprenticeship/vocational school	37.1
		higher professional education	21.2
		university/college	19.6
		Swiss-Wide: Written[c]	
15–24	3.3	Primary school	3.3
25–39	24.2	secondary	4.1
40–54	28.8	grammar school	12.6
55–69	28.1	apprenticeship/vocational school	36.9
>70	15.4	higher professional education	19.9
		university/college	23.2

[a]Percentage of male respondents was 51.6; percentage of female respondents was 48.4.
[b]Percentage of male respondents was 48.9; percentage of female respondents was 51.1.
[c]Percentage of male respondents was 62.4; percentage of female respondents was 37.6.

The samples in the River Thur survey and the nationwide phone survey had a well-balanced gender distribution. Considerably more men than women responded to the nationwide written survey. A one-way ANOVA, however, revealed no significant differences between the mean ratings of men and women. In terms of age, all the surveys have a relatively even distribution. Exceptions to this are the proportionally high share of the youngest age group (15–24 years) for the River Thur survey, and the small share of the same age group for the nationwide written survey.

[21] As part of the River Thur survey, we asked also for respondents' membership in a stakeholder group. On the basis of this information we were able to divide the responses for further analysis into a set of stakeholder groups involved in the actual decision-making process (N = 46) and a set of stakeholder groups not involved (N = 120).

2.2. Data Analysis

[22] The qualitative interviews of the case studies Thur and Flaz/Inn were recorded on audio tape, transcribed and coded using the program NViVo and finally interpreted from a content analysis perspective [*Lamnek*, 1988]. We used these qualitative data as the basis for the survey design. For example, we collected all aspects of river corridor importance that were mentioned by the interviewees and used them as items for the nationwide phone survey.

[23] We conducted several statistical analyses using SPSS for Mac OSX version 11.0 to examine the quantitative data. In order to interpret the data on the significance of local river corridors (section 4.1), we reduced the various aspects using a principal components factor analysis. We further calculated the mean values from the respective aspects for the two resulting factors. To test for differences in these mean values, we employed a *t* test for dependent samples. For the other survey questions, we calculated the descriptive statistics, and employed *t* tests for dependent samples to test the statistical significance of differences between mean values (see section 4.1.3). In order to obtain the mean values for stakeholder preferences, we calculated the mean values for the responses from each single stakeholder group (e.g., affected farmers) and then averaged these values.

[24] To test the statistical significance of differences in the mean values for the preferences of the local public, the involved stakeholder groups and the uninvolved stakeholder groups (section 4.2), we weighted the responses of the single stakeholder groups to account for varying response numbers among the different groups. We then conducted a one-way ANOVA with Bonferroni and Fisher's LSD Post-Hoc tests. These were chosen as they provide one more rigorous and one less strict test of the statistical significance of differences in mean values between all pairs of these three groups (i.e., local public versus involved stakeholder groups, involved stakeholder groups versus not involved stakeholder groups, local public versus not involved stakeholder groups). Further, we tested the statistical significance of differences in mean values for the preferences of the local public regarding the River Thur project and the Swiss population with *t* tests for independent samples.

3. Case Studies: Thur and Flaz/Inn

3.1. Case Study Thur (Weinfelden/Bürglen)

[25] The first case study focused on the area between the community Weinfelden and Bürglen along the River Thur in northeast Switzerland (Canton Thurgau). There the river project team from the cantonal Office for the Environment (AfU Thurgau) had developed plans for a large river project with the goal of combining flood protection with widening the river and constructing a retention basin. This project was part of the 2nd Thur correction that was launched after disastrous floods in 1978. Several restoration projects along the River Thur have already been carried out (e.g., in Frauenfeld, Gütighausen, Niederneunforn). Some of these projects were controversial, with conflicting opinions among agricultural interest groups, environmental organizations and the Federal Office for Forest and Landscape [*Zaugg*, 2002; *Zaugg Stern*, 2006]. As the locals knew about previous projects of the second Thur correction they were familiar with the idea of river restoration along the River Thur and how it could change the river's landscape.

[26] The river project Weinfelden-Bürglen started in 1999. By January 2000, the project team had drawn up an initial project scheme. In 2003 a committee was set up to monitor the project, consisting of several cantonal and federal offices for water engineering, the environment, agriculture, forestry and fisheries. Two years after having worked out the first project scenario, the project team established a so-called regional working group in order to facilitate a public participative decision-making procedure. The regional working group consists of invited representatives of the following groups (numbers in brackets indicate the number of the representatives of each stakeholder group

in the regional working group): people owning (3) or using (2) land affected by the project, the gravel industry (1), fishing (1) and hunting (1) communities, supraregional environmental NGOs (2), regional Farmers Union (1), Office of Tourism Weinfelden (1), and the mayors of the boroughs affected (2). The mayor of one of the affected boroughs (Bürglen) was asked by the project team to lead and act as a moderator for the regional working group. The participants were either personally invited or an invitation was sent to the organization with a request to select a representative for the regional working group. Meetings were therefore not open to the general public and other stakeholder groups.

[27] At their first meeting (in November 2003) with the regional working group, the project team defined the following three overall project goals: (1) widening the river, (2) constructing a retention basin, and (3) restoring the existing dams. Beyond working toward these main goals, the participants had considerable room to maneuver. The project team said that there were no concrete project plans apart from these three project goals, but most of the stakeholders did not believe this as they knew about the existing project scheme. The participants were asked to draw up and to explain their own project scenarios for the second meeting. These were supposed to provide the basis for the further negotiation process.

[28] At the second meeting of the regional working group, strong opposition to the proposed project became evident. This was mainly from landowners and land users. Most participants believed that the participative decision-making process was only something the project team felt they were supposed to do, without actually being willing to incorporate stakeholder perspectives and preferences into potential project schemes. There was also some misunderstanding about the necessity for local flood protection measures versus systemic measures for the whole river and about the potential use of a retention basin. The landowners further criticized the lack of concrete information on compensation. The project team was able to clarify some of the misunderstandings, and at the third meeting there was more willingness to find a consensus and to reconcile differing claims.

[29] At the same time, a cantonal petition was launched by a member of the regional Farmers' Union about the lack of wider public participation and discussion of the project. This meant the project team's design of the public participation process was discredited. The project team has since commissioned a private firm to design and present four scenarios for further discussion with the regional working group. The local public is sporadically informed about the state of the project through the distribution of project leaflets (1000 copies printed). A very short overview is also available on the Web page of the cantonal Office for the Environment (http://www.umwelt.tg.ch/). A local survey [*Junker et al.*, 2003] found that the local population's level of knowledge about the ongoing project was very low (know about the project: 19.6%; do not know about the project: 75.4%; no answer: 5%).

3.2. Case Study Flaz/Inn (Samedan)

[30] In contrast to the Thur project, the Flaz/Inn project in Samedan in the Engadin region (southeast Switzerland) has already been successfully completed. After a flood event in 1987, the project was initiated by Canton Grisons initially to focus on flood protection measures. However, the local authorities saw no need to pursue either flood protection or a restoration project in the region at the time.

[31] The Canton reacted (in 1997) by declaring substantial parts of the area to be a high-risk flood zone so that no new building could take place in this area. In reaction to this measure, Samedan's local council decided to develop a variety of project scenarios in cooperation with the cantonal offices and federal research institutions. Several of these scenarios included ecological rehabilitation aspects. After the community voted against more expensive restoration scenarios and for purely technical flood protection in 1997, a potential restoration project was halted. A new mayor was, however, elected in 1998, who personally saw the advantages of river rehabilitation and openly invited everybody interested and potentially affected to work on further river scenarios. He also explicitly invited outspoken opponents of the restoration project scenarios to participate.

[32] A regional working group was then launched (led by the mayor), as well as an ecological monitoring committee. The regional working group consisted of representatives of farmers (1), residents of Samedan (3), and the local industry (2). The ecological monitoring committee was made up of stakeholders from: the cantonal hunting and fishing offices (2), the Grison Cantonal Office of Environment (1), ornithologists (1), environmental organizations (1), the local public (1) and fishing/hunting groups (1).

[33] These two working groups, in cooperation with the Grison Cantonal Office for Civil Engineering, worked out several scenarios ranging from purely technical flood protection schemes to combinations of flood protection and, to varying extents, ecological restoration measures. Throughout this whole planning and decision-making process, the local public was continuously and very openly informed via the monthly community newsletter. Further, the mayor established weekly office hours to answer local inhabitants' questions. Samedan's citizens finally voted on a scenario proposed by the local council in the village assembly on 15 June 2000 and on credit for the project on 26 November 2000. The proposed scheme was the maximum scenario, involving a dismantling of the dams in the area, a relocation of parts of the river Flaz and extensive ecological restoration measures along the new Flaz bed, along its old bed and along the river Inn (for more information on the project see www.flaz.ch).

[34] In contrast to the Thur project, the locals living near the rivers Flaz/Inn first had to revise their negative attitudes toward a restoration project and only slowly recognized its potential. It became apparent during the case study interviews that the continuous and open planning and decision-making processes were largely responsible for the development of positive attitudes toward a project that combined flood protection with an ecological restoration. In the end, the proposed maximum scenario, as described above, received the majority of votes (pro: 128; contra: 6). This scenario has since been implemented.

[35] Evidently, the context of both the decision-making and the involvement processes differed in the two projects, Thur and Flaz/Inn. For example, they affected different number of inhabitants (Weinfelden/Bürglen: 12400; Samedan: 2000). Nevertheless, such differences do not have to influ-

Table 3. Principal Component Factor Loadings and Their Mean Values for Perceived Importance of Swiss Local River Corridors[a]

Aspects of Importance[b]	Living Space	Functional Space	Mean Value
Space for economic use (agriculture/forestry)	0.185	**0.674**	2.19
Achievement of engineering	0.061	**0.730**	2.56
Source of danger	0.065	**0.615**	2.57
Channel/drainage	0.189	**0.652**	3.08
Something belonging to me	**0.673**	0.228	3.20
Part of everyday living space	**0.753**	0.093	3.44
Source of life	**0.667**	0.295	3.54
Part of home	**0.636**	0.210	3.63
Peaceful and quiet place	**0.789**	0.053	3.63
Space for experiencing nature	**0.774**	0.129	3.70
Recreation area	**0.789**	0.055	3.81
Ecologically valuable space	**0.653**	0.099	4.05
Mean value of items/factor	3.65[c]	2.72	
Cronbach's alpha	0.88	0.63	

[a]Factor loadings according to Varimax rotation. This was a phone survey, with N = 2016. Boldface items represent factors loaded on most strongly (>0.600).

[b]Aspects of importance rated on a five-point Likert scale: 1, not important; 2, slightly important; 3, medium importance; 4, important; and 5, very important.

[c]Significantly larger than mean value of factor "functional space" at p = 0.000.

ence how easily a public involvement procedure can be conducted and how successful it might be [*Beierle and Konisky*, 2000].

4. Results

4.1. Local Rivers: Do They Provide a Living Space or a Functional Space?

[36] We first examined the question whether the local people perceive the local river corridors to be part of their living space or only as a purely functional space. For this purpose, we found the following indicators to be suitable: (1) the importance of the local river corridors for the public, (2) their use for recreation and leisure, and (3) the strength of people's personal relationships with the local river corridors as well as their level of concern about planned river restoration projects in the neighborhood.

4.1.1. Importance of River Reaches

[37] We investigated how important the local river corridors are for local inhabitants to gain some basic reference points for analyzing their (conscious or subconscious) understanding of the river corridors, as part of their living space or as a functional space [*Tunstall et al.*, 1997; *Backhaus and Müller-Böker*, 2006].

[38] We incorporated all aspects of importance that were mentioned in the exploratory qualitative interviews during the two case studies in the representative phone survey. They were reduced in a principal components factor analysis and were assigned to factors if the loading on the factor was at least 0.600. The two factors "living space" (eight items) and "functional space" (four items) could be clearly identified (Table 3). They have an eigenvalue of 4.7 and 1.5, respectively, and they account for 52% of the variance in all aspects.

[39] The overall mean value of the aspects that characterize the local river landscape as a living space were significantly higher than the mean evaluation score of the aspects pointing to its perception as a functional space. Altogether, the importance of the local river landscape for the public seems to have much more to do with aspects of living space and quality of life than with aspects of functional space.

4.1.2. Use of River Reaches

[40] Another indicator of the role local river reaches may play in people's everyday lives is how they use this space. The nationwide phone survey included questions about different forms of use as well as their frequency. (The following forms of use were examined: walking, fishing, bathing, relaxing, biking/cycling, riding, jogging/Nordic walking, barbecuing, walking the dog, working, observing nature, meeting people, going by boat, and other.)

[41] Overall, the survey showed river corridors are frequently and variously used by locals (several times/week: 32.4%; once/week: 20.9%; several times/year: 39.0%; less often: 4.8%; never: 2.9%). (If several activities were mentioned, the highest frequency was used in the computation.) About half of all respondents use the local rivers and the land along their banks once a week or even several times a week. Most respondents pursue some sort of activity along the river at least several times a year. Only a small fraction says it uses the river less often or never. Of the various activities assessed in the survey, walking, relaxing and observing nature were most frequent.

[42] In interpreting these data, we have to consider that the respondents to the survey may use the river reaches more often than those who did not participate in the survey. However, the number of users is, nevertheless, still substantial, and it appears that river landscapes play an important role in many people's everyday lives.

4.1.3. Respondents' Personal Relationships With Rivers and Concern About Restoration Projects

[43] In the nationwide phone survey we included two further indicators that we think offer additional insight into whether the local river reaches' are perceived more as living or as functional spaces. The first is the perceived strength of respondents' personal relationships with rivers and the second their level of concern about river restoration projects in the neighborhood. It can be assumed that a strong personal relationship correlates positively with people's perception of river landscapes as local living spaces. The same is true for a high level of concern about planned rehabilitation measures in the local river sector [*House and Fordham*, 1997]. The results clearly indicate that most respondents have a strong personal relationship with rivers in general and a medium level of concern about planned river restoration projects in their neighborhood (see Table 4).

[44] In order to evaluate the context for interpreting these results, the written nationwide survey included a question on the importance of rivers and riversides in comparison to the meaning of other typical features of a landscape. The results clearly show that river landscapes (reference value 3.0) are rated on average similarly to lakes ($\bar{x}$ = 3.0) and forests ($\bar{x}$ = 3.0), but higher than mountains ($\bar{x}$ = 3.11), fields and meadows ($\bar{x}$ = 3.35) and, interestingly, also higher than villages ($\bar{x}$ = 3.47) and towns ($\bar{x}$ = 3.76) (Respondents rated the significance on a five-point Likert scale (1, much less; 2, less; 3, same; 4, more; 5, much more).

Table 4. Perceived Strength of Respondents' Personal Relationships With River Landscapes and Level of Concern About River Restoration Projects in the Neighborhood of Their Homes[a]

Rating	Respondents' Personal Relationship With Rivers,[b] %	Respondents' Level of Concern About Local Restoration Projects,[c] %
1	6.9	13.2
2	22.0	20.0
3	39.9	29.9
4	30.0	21.7
5		13.2
No answer	1.2	1.9
Mean	2.97	3.07

[a]Phone survey Switzerland wide, with N = 2016.
[b]Question: How strong is your personal relationship with rivers, or perhaps only to one river? Rating was on a four-point Likert scale: 1, very weak; 2, rather weak; 3, rather strong; and 4, very strong.
[c]Question: Assuming a restoration project is planned for a river in your neighborhood, how concerned would you personally be about it? Rating was on a five-point Likert scale: 1, very low; 2, rather low; 3, medium; 4, rather high; and 5, very high.

[45] From the criteria above, we conclude that people perceive the local river landscapes rather as part of their living space than as a functional space – even though the rivers are still mostly channeled and far from "natural." The data indicate that the river corridors are very important for most respondents in their everyday lives, for example, as recreational and natural spaces.

4.2. How Well Do the Involved Stakeholder Groups Represent Public Interests?

[46] It is frequently argued that the aims and interests of the broader public are identical with those of the salient and organized stakeholder groups and/or the project managers. They can thus be represented by these groups and/or the project managers [*Moote et al.*, 1997; *Blahna and Yonts-Shepard*, 1989; *Connelly and Knuth*, 2002]. We were concerned therefore to find out whether this is the case or whether there are differences between the aims of "involved" stakeholder groups, of "uninvolved" stakeholder groups, of the general local public and of the project managers. The Thur case study shows that the public and the organized, not involved stakeholder groups have very similar preferences for the future of the local river corridor.

[47] For the most controversial issues, such as naturalness, forestry, recreation and agricultural use of land, we found the public's preferences to be different from those of the stakeholder groups involved. The comparison of the quantitative survey data and also the qualitative interview data of the local Thur public with the qualitative data of the project team shows, however, that the public's preferences with regard to these issues are very similar to the aims of the project team. All of the interest groups (involved and not involved) and the public share strong preferences with regard to flood protection and groundwater quality. However, their preferences differ considerably from those of the managing project team (Figure 2). This finding was also confirmed when the qualitative interview data of the local public, stakeholders and the project team were compared. It seems that more discussion about the improvement of the water and groundwater quality is needed since these topics are not explicit aims of the river Thur project although they are relevant to all of the stakeholder groups. Furthermore, measures to increase flood protection are prone to generate misunderstandings because the project team aims to improve flood protection not only locally but also for the whole river Thur system. Locals and the stakeholder groups, however, tend to see only the local need. A comparison of the findings with the data from the nationwide survey supports the finding that the attitudes of the River Thur locals toward the issues in the survey are very similar to those for the whole of Switzerland (Figure 3).

4.3. Participation Versus Optimal Restoration Projects?

[48] In the literature on natural resource management and among managers of restoration projects it is often argued that more inclusive public participation in river restorations

	Local Public[b]		Stakeholder Groups: Not Involved[b] (Recreational Groups)		Stakeholder Groups: Involved[b]		Managing Project Team
Aspects	Mean	Need for Action[d]	Mean	Need for Action[d]	Mean	Need for Action[d]	Need for Action[c]
Naturalness	3.78[e]	↑	3.85[f]	↑	2.85	→	↑
Forestry	2.98[e]	→	3.11[f]	→	2.12	↘	↘
Recreation	3.51[e]	↗	3.39[f]	↗	2.89	→	↗
Agriculture	2.27[e]	↘	2.21[f]	↘	3.12	→	↘
Flood protection	3.15	→	3.01	→	2.96	→	↑
Water quality	3.78[g]	↗	4.31	↑	4.20	↑	→
Groundwater quality	4.06	↑	4.12	↑	4.22	↑	→

[a]Local public, N=124; organized stakeholder groups (recreational groups) not involved in the decision-making process, N=120; stakeholder groups involved in the decision-making process, N=46; and the managing project team, N=6.
[b]Quantitative data according to the following scale: 1, much less; 2, less; 3, same as now; 4, more; 5, much more.
[c]Qualitative data.
[d]Need for action scale derived from mean values.
[e]Differences in mean values between responses from the local public and involved stakeholder groups statistically significant for Bonferroni and Fisher's LSD PostHoc tests at $p < 0.05$.
[f]Differences in mean values between responses from not involved stakeholder groups and involved stakeholder groups (for same tests as [e]).
[g]Difference in mean values between responses from the local public and not involved stakeholder groups (for same tests as [e]).

Figure 2. Case study Thur. Preferences for the need for action in regard to the future of the local river corridor of the local public, organized stakeholder groups (recreational groups) not involved in the decision-making process, stakeholder groups involved in the decision-making process, and the managing project team are shown. See footnote "a" for additional information.

	Swiss Public	
Aspects	Mean	Need for Action[b]
Naturalness	3.83[c]	↑
Forestry	3.11[c]	→
Recreation	3.43[c]	↗
Agriculture	2.42[c]	↘
Flood protection	3.43[d]	↗
Water quality	3.87[c]	↗
Groundwater	4.11[c]	↑

[a]Written survey, N=1005.
[b]Quantitative data are according to the following scale: 1, much less; 2, less; 3, same as now; 4, more; 5, much more.
[c]Here $p > 0.05$ for independent samples *t* test on differences in mean values between responses from River Thur locals (Table 5) and Swiss population.
[d]Here $p < 0.05$.

Figure 3. Preferences of Swiss population for need for action with regard to local river corridors. For written survey, N = 1005. Footnote "a" provides survey total.

projects could threaten optimal implementation of higher-ranking project aims. Further, it is frequently argued that broader public participation could lead to increased resistance during project negotiations and implementation [*Fordham et al.*, 1991; *Bruton*, 1980]. However, is wide public involvement really counterproductive? Our findings show that the expressed preferences and interests of the general public are not very different from those of the project team. In fact, the Swiss survey showed that the public had very positive attitudes toward restorations, which suggests that involving the general public could have a favorable impact on the optimal outcome of restoration projects (Table 5).

[49] In the cases where preferences differ considerably, as happened in the first phase of the Flaz/Inn project, widely inclusive public participation strategies are likely to promote a transformation of opposing views into cooperative and approving ones. The qualitative findings from the case study Flaz/Inn suggest that the opponents of restoration measures will be less motivated to prevent a project if they are directly involved in planning (see case study description Flaz/Inn in section 3.2).

[50] In situations such as the case study Thur, where the public tends to agree more with the aims of the project team than the involved stakeholder groups (see Figure 3), a wider inclusion of the local public is not likely to be detrimental, but rather should help to promote the ecological aims of the restoration project. Participation schemes where the representation of stakeholders is skewed toward stakeholders directly affected economically [*Curtis et al.*, 1995; *Fortman and Lewis*, 1987; *Moote et al.*, 1997] are more likely to face the kind of resistance there was to the Thur project where an official petition was launched against it (see case study description Thur in section 3.1). Thus our data support findings of studies in other areas of natural resource management that widely inclusive stakeholder involvement does not only help to avoid conflicts and to bring about a higher approval of management decisions, but that it also leads to a better accomplishment of project aims [*Beierle*, 2000].

5. Discussion

[51] The main aim of our study was to examine the question of which stakeholder groups should be involved in deciding about river restoration projects. Our results imply that involving the wider and unorganized local population beyond politically influential stakeholder groups is not only important but furthermore has the potential to enhance support for project aims. This insight is based on our empirical findings on the residents' attitudes and interests toward rivers and their restoration in particular the

Table 5. Attitudes of Swiss Population to River Restorations in Different Cases[a]

Measured Items[b]	Opposed, %	In Favor, %	No Answer, %	Mean
Flood protection in combination with river restoration in Switzerland	12.0	85.1	2.8	3.32
Flood protection in combination with river restoration in own residential region	20.1	75.6	4.4	3.19[c]
Pure river restoration in Switzerland	34.5	60.9	4.7	2.90[c,d]
Pure river restoration in own residential region	39.2	55.2	5.6	2.83[c,e]

[a]Phone survey, with N = 2016.
[b]Average evaluation in percent along a four-point Likert scale: 1, strongly opposed; 2, rather opposed; 3, rather in favor; and 4, strongly in favor. Scale values 1 and 2 were grouped here as "opposed"; 3 and 4 were grouped as "in favor."
[c]Significantly lower than attitude toward flood protection in combination with river restoration in Switzerland at $p < 0.01$.
[d]Significantly lower than attitude toward flood protection in combination with river restoration in own residential region at $p < 0.01$.
[e]Significantly lower than attitude toward pure river restoration in Switzerland at $p < 0.01$.

answers to the following questions: (1) Are the river corridors a meaningful part of the residents' everyday life, so that enhancing identification, trust and the sense of responsibility are relevant objectives of public involvement? (2) Do the stakeholders generally involved in decision making also represent the local residents' aims, preferences and interests? (3) Do the wider public's aims clash with the aims of the river restoration project, i.e., with those of the project team?

[52] 1. Our findings confirmed that river corridors are highly significant for people's local living space. Thus people were found to attach importance to river corridors as recreational and natural spaces, but also as landscapes associated with local identity, whereas functional aspects were perceived as significantly less relevant. River reaches also appeared to be very intensively used by the residents for recreation and leisure activities. Finally, it became evident that people tend to relate strongly to these areas, at least as strongly as to most other landscape features and even more strongly than to villages and towns. Thus river landscapes are a significant part of people's everyday environment, which means the residents tend to experience exterior interventions in this area without their involvement as an intrusion.

[53] 2. Our findings further substantiated the claims that the interests of the local public cannot be adequately represented by members of those stakeholder groups which are generally included in the decision-making process. The preferences and aims of the wider public appear to differ considerably from those of these organized stakeholders, and can be regarded as at least as important as those of the stakeholders [*Curtis et al.*, 1995]. This applies particularly to requirements regarding recreation activities, so that at least a direct representation of the public interest "recreation" is needed. An "independent" representation of this group by the project management itself, as has usually been the case so far, is not appropriate either. This is not only for reasons of legitimacy, but also because the interests of the project management do not fully correspond with those of the recreational groups.

[54] 3. In terms of the third question, our findings indicate that including the public tends to support rather than jeopardize far-reaching restoration goals. The public often has a very positive attitude toward restoration projects. We also found the preferences of the public to be closer to the project managers' aims than to those of the involved stakeholders. Therefore including representatives of the general public could further the project managers' aims. If the only stakeholders who are involved are those who are organized and materially affected, as suggested by *Mitchell* [1997], there is a danger of overrepresenting stakeholder interests (e.g., those of landowners, farmers' unions) that are in opposition to restoration aims. Involving the local public could also weaken the potential resistance of a materially affected minority of stakeholders and thus lead to more realistic project solutions based on a more representative range of interests. A widened debate might be an opportunity for the affected stakeholders as well, particularly for farmers and foresters, since this could contribute to increased recognition of their services and, in some cases, sacrifices.

[55] Our results indicate that involving organized and materially affected stakeholders according to the *Mitchell* [1997] scheme appears to be sufficient to avoid conflicts. Since river restorations, however, affect the living space of the local population, an extended circle of stakeholders (e.g., local recreational users) needs to be involved. That is, more long-term and far-reaching objectives of public participation should be aimed for. These objectives include promoting an increased identification of the locals with their changed everyday living space [*Buchecker et al.*, 2003; *Weichhart*, 1990], as well as a sense of local self-determination and responsibility for the local environment. Planned public involvement should also aim to increase trust between the public and the authorities, and to foster a social learning process promoting future participation as well as environmental protection aims [*Beierle*, 2000; *Pahl-Wostl*, 2002; *Mostert*, 2003; *Beierle and Cayford*, 2002].

[56] Inviting only a restricted circle of stakeholder groups to participate in the decision-making process of river restoration projects would mean just focusing on conflict prevention and missing a rare opportunity to promote these wider social objectives.

6. Conclusions

[57] A general shift in the social discourse on natural resource management has taken place in recent decades, moving from a focus on efficient land use in economic terms toward a focus on sustainable development. This is true for the domains of land development, forest and river management. The main economic aim in river management has been and continues to be flood protection. In the past decade this has been extended to include ecological aspects providing more space for nature and restoring rivers to more natural states, as specified in various laws and regulations [*BWG*, 1991]. The social objectives of sustainability, maintaining or enhancing people's quality of life and actively involving the public, have so far been neglected in the management of river landscapes. These aspects have, however, increasingly been taken into account in land development and forest management. As our study has shown, river landscapes are at least as much part of people's living space, as settlements and forests. Therefore more involvement of the public, as practiced in planning other domains of people's living space is not only justified, but also needed.

[58] The call for broader public involvement schemes is often countered by the objection that river projects entail aspects that are not negotiable, such as the implementation of federal policy guidelines on both flood protection and restoration aims [*BWG*, 1991]. If clear limits, however, are defined within which an examination and communication of the range of existing interests can take place and within which several scenarios can be discussed, then these aims can still be met. Wider stakeholder involvement also tends, as an added benefit, to lead to public support for restoration efforts.

[59] According to our study, it seems that all of the indicated preferences of the public for involvement in restoration projects could be best accommodated if project managers offer a variety of ways of being involved, as other authors have also recommended [e.g., *Gregory*, 2000; *Moote et al.*, 1997]. Social objectives might best be served by including the wider public in the first planning phase, as other authors also suggest [e.g., *Junker and Buchecker*, 2006; *Lubell*, 2000]. Deliberate instruments for public participation could be expedient for achieving this, such

as planning cells, advisory committees, future scenarios, public surveys, citizen reports and public value forums [*Gessenharter*, 1996; *Keeney et al.*, 1990; *Beierle and Cayford*, 2002]. Then the whole range of elicited aims and preferences could serve as a basis for all further planning measures. The representation of local recreational groups seems appropriate in this first planning phase, but also in the consensus-finding phase when different scenarios are negotiated.

[60] More research is needed to optimize the decision-making process in river restoration, in particular regarding the effect and efficiency of different forms of public involvement [*Beierle and Cayford*, 2002]. Research schemes using a measurement of indicators at the onset and a measurement of the same indicators at the end of a public involvement process (premeasurement/postmeasurement method) appear very promising, as initial experiments in landscape planning have shown [*Gehring et al.*, 2004; *Buchecker and Hunziker*, 2006].

[61] Developing suitable instruments to evaluate and monitor the success (or failure) of public involvement schemes is an essential precondition for achieving social and institutional learning objectives. In summary, only if the wider public can be provided with adequate opportunities to become involved in the planning process will it be possible to tap the full potential of river restoration projects for a sustainable landscape development.

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Paper III

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Aesthetic preferences versus ecological objectives in river restorations

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Abstract

Restoring rivers has become a common practice in the management of natural resources. While the ecological rehabilitation of river corridors is a clear objective for project planners, it cannot necessarily be assumed that the public will perceive the effects to be aesthetically positive. To assess people's perceptions of the visual attractiveness of restoration scenarios, we conducted a representative Switzerland-wide survey using photographic simulations and related the reported preferences to experts' assessments of the ecological integrity of these scenarios based on eco-morphological criteria. We further considered how natural the public perceived river corridors to be and how much these corridors satisfy public needs. The results of the survey show that aesthetic preferences relate more positively to eco-morphological quality than expected, and that the public's aesthetic preferences are primarily influenced by perceived naturalness. Even slightly improved eco-morphological quality was rated higher aesthetically, which suggests that the aesthetic outcomes of even small efforts to restore rivers are viewed positively by the public.

Keywords: Perception; Rehabilitation measures; Water management; Expert objectives; Perceived naturalness; Planning; Decision-making

1. Introduction

Rivers worldwide have been channelled and modified by human activities in the past. The last few decades have, however, been marked by a paradigmatic shift in the practice of river engineering. It has become common practice to allow rivers more space again and thus to augment the quality of riverine natural habitats. River restorations are today expected – often by law – to combine improved flood protection measures with the ecological rehabilitation of river corridors (Boon et al., 2000; European Union, 2000; BWG, 2001).

This raises questions about the ecological revitalization of rivers and their public acceptance and support. Does increasing the naturalness of rivers and the land along them make them more aesthetically appealing to the public? Several studies have shown that restoration projects tend to be, in general, relatively well accepted after completion (Junker and Buchecker, 2006; WWF, 2004; Tunstall et al., 2000). Nevertheless, actual restoration projects frequently meet with resistance during the planning stage, and there may be conflicts between project planners and stakeholders. As a result the proposed projects may not be fully implemented (Zaugg, 2003; Woolley and McGinnis, 2000). Resistance often arises because restorations imply a loss of agricultural land along the rivers.

Restoration project proposals may also fail due to lack of public support. As several case studies have shown (Zaugg, 2005; Bratrich, 2004), this has often to do with the fact that restoration projects alter the local living space for recreation and leisure activities. Local expectations about how to use restored river spaces for recreation purposes can influence public opinion either negatively or positively (Junker et al., 2003; Camenisch et al., 2001), and seem to depend on how attractive the particular living and recreational space is assessed to be. This implies that, how the public view potential restoration scenarios is mainly based on aesthetic perceptional criteria.

In contrast, project planners and landscape planning experts primarily pursue flood protection and ecological rehabilitation objectives, and therefore evaluate project scenarios during the planning and decision-making phases mostly according to these criteria (Boon et al., 2000; Zube, 1973; Daniel and Vining, 1983).

In order to plan, communicate and negotiate river restoration projects efficiently, it is therefore important to know whether the aesthetic preferences of the local public match the ecological and hydrological objectives of the experts and planners or

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whether these differ or at least overlap (Parsons, 1995; Nassauer, 2004; Zedler and Leach, 1998). It is also of scientific and practical value to find out more about the factors that affect people's evaluations of the aesthetics of river corridors and their restoration.

How expert's assessments of ecological quality relate to the public's aesthetic preferences for landscapes is controversial. This has been the subject of a number of recent studies including various kinds of landscapes, such as wetlands (Nassauer, 2004), national parks (Steinitz, 1990), suburban and urban areas (Nassauer, 1993; Gobster, 1994), agricultural land undergoing spontaneous reforestation (Hunziker and Kienast, 1999), industrial sites (Hands and Brown, 2002), or with a focus on vegetation types (Williams and Cary, 2002; Schulhof, 1989; Akbar et al., 2003; Purcell and Lamb, 1998). Generally, these studies have found that people tend to prefer aesthetically landscapes and parts of landscapes that have been assessed by experts as natural or near-natural (Daniel, 2001b). Several studies, on the other hand, found an incongruence between aesthetic preferences and ecological quality in general (Williams and Cary, 2002; Parsons, 1995; Van den Berg and Vlek, 1998; Karjalainen, 1996), especially where higher levels of ecological quality were involved (Gobster, 1994; Hands and Brown, 2002; Nassauer, 1993).

It would be useful, however, to find out where measures of ecological integrity and public aesthetic preferences are both potentially high in order to define management options that are culturally sustainable. Cultural sustainability has to do here with Nassauer's (1997) claim that: "Landscapes that are ecologically sound, and that also evoke enjoyment and approval, are more likely to be sustained by appropriate human care over the long term" (p. 69). If both public aesthetic preferences and ecological objectives are taken into account in the planning of landscape changes, it will be more likely that ecological innovations will meet with public acceptance and sustained support (Nassauer et al., 2001; Decamps, 2001).

The relationship between ecological integrity (as judged by experts) and public perceptions of the aesthetic attractiveness of a given landscape or part of a landscape is probably influenced by a third factor, namely how natural the landscape is perceived to be (Williams and Cary, 2002). To what extent then does the naturalness of a landscape as perceived by the public relate to expert's evaluations of its ecological integrity (Daniel, 2001a; Mozingo, 1997; Nassauer, 1992; Williams and Cary, 2002)? Few studies have shown that they tend to differ and that a clear relationship between the two cannot necessarily be assumed (e.g. Özguner and Kendle, 2004). The majority of studies indicate that perceived naturalness plays a powerful role in influencing people's aesthetic preferences (Nassauer, 1992, 2004; Gobster and Westphal, 2004; Hull et al., 2001; Purcell and Lamb, 1998; Ribe, 1990; Schroeder, 1991).

Another factor that is often expected to affect aesthetic preferences is the extent to which a given landscape is perceived to satisfy human needs. Different theories of landscape aesthetics have postulated a variety of needs. These range from biological needs, such as those formulated in Appleton's (1995) "prospect-refuge theory" and Kaplan and Kaplan's (1989) "information processing theory", to social needs for identity, stability and communication (Appleyard, 1979; Nohl, 1983, 1987; Hoisl et al., 1987; Buchecker et al., 2003). On a functional level of landscape use, human needs frequently also imply, in a less abstract form, the availability of infrastructure for leisure and recreation activities or for physical and visual access to a resource (Zedler and Leach, 1998; Booth, 2005; Tahvanainen et al., 2001). Infrastructure that facilitates such recreational and access needs has been reported to benefit aesthetic acceptance in several studies (Gobster and Westphal, 2004; Junker et al., 2003).

Further potential factors that may affect aesthetic preference are certain socio-demographic variables. Empirical research indicates they are important understanding landscape perceptions and preferences. Various studies have demonstrated that variables, such as age (Tahvanainen et al., 2001; Van den Berg and Koole, 2006), place of residence (Tremblay and Dunlap, 1978; Van den Berg and Koole, 2006; Tahvanainen et al., 2001), and educational level (Steel et al., 1994; Harvey, 1995; Howell and Laska, 1992; Milbrath, 1984) often have a significant influence on people's aesthetic preferences and environmental values.

The relationship between aesthetic preferences and the various factors mentioned above has been explored to some extent with respect to the ecological restoration of forest areas (Barro and Bright, 1998), urban parks (Raffetto, 1993; Gobster and Barro, 2000) and wetlands (Nassauer, 2004). There have, however, been only very few empirical studies of the potential interface between ecological quality as evaluated by experts and people's evaluations of visual attractiveness. Even fewer studies have also taken into account such mediating factors as how natural restored river corridors are perceived to be and how well they satisfy people's needs (House and Sangster, 1991; Green and Tunstall, 1992; Schaumann and Salisbury, 1998). The results of our research should help to fill this research gap and to clarify inconsistencies in the literature.

One reason for the lack of clarity is that it has been difficult in the past to make an empirical comparison between aesthetic preferences and ecological quality due to the lack of suitable reference scales for varying states of ecological integrity. An exception to this is the so-called "module-step concept" (BUWAL, 1998), which provides actual criteria for evaluating the ecological quality of management and restoration schemes for rivers. Ecological quality is frequently defined by measures of biodiversity (Duelli et al., 2007; Karr, 1991; Nassauer, 1992; Kimmins, 2001), but in this module-step concept it is based on visible eco-morphological criteria for assessing rivers and their banks. Therefore, we use the term 'eco-morphological quality' instead of 'ecological quality'. These eco-morphological criteria result in relatively well-defined evaluation levels, i.e. there is a fairly clear consensus about which kind of river states would be ecologically desirable when restoring rivers (Parson and Daniel, 2002; BWG et al., 2001).

This unusual consensus allows us to address the following open research questions in this paper:

- What kind of relationship is there between people's aesthetic assessments of river restoration scenarios and the scenarios' level of eco-morphological quality?

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- Does the public's perception and assessment of the naturalness of different river restoration scenarios correspond to experts' assessments of eco-morphological quality?
- How does perceived 'naturalness' relate to people's aesthetic preferences?
- How do the perceived satisfaction of needs and the usability of river restoration scenarios for recreation and leisure purposes influence people's assessments of their aesthetic appearance?
- To what extent can people's aesthetic assessments of river restoration scenarios be explained by the variables: eco-morphological quality, perceived naturalness, satisfaction of needs and suitability for recreation and leisure purposes?

These questions were analysed in a social science project within the overall framework of an interdisciplinary research project on river restoration, the so-called "Rhone-Thur project" (see also http://www.rivermanagement.ch, last accessed February 26, 2007).

2. Method

2.1. Overall research design and variables used

This study is based on part of a representative nation-wide survey to do with rivers and river restoration in Switzerland. The relevant part of the written questionnaire contained a series of computerized visual simulations of river restoration scenarios. Respondents were asked to rate all of the depicted scenarios for aesthetic preference, perceived naturalness and satisfaction of needs on a seven-point Likert scale ranging from "very little" over "middle" to "very much".

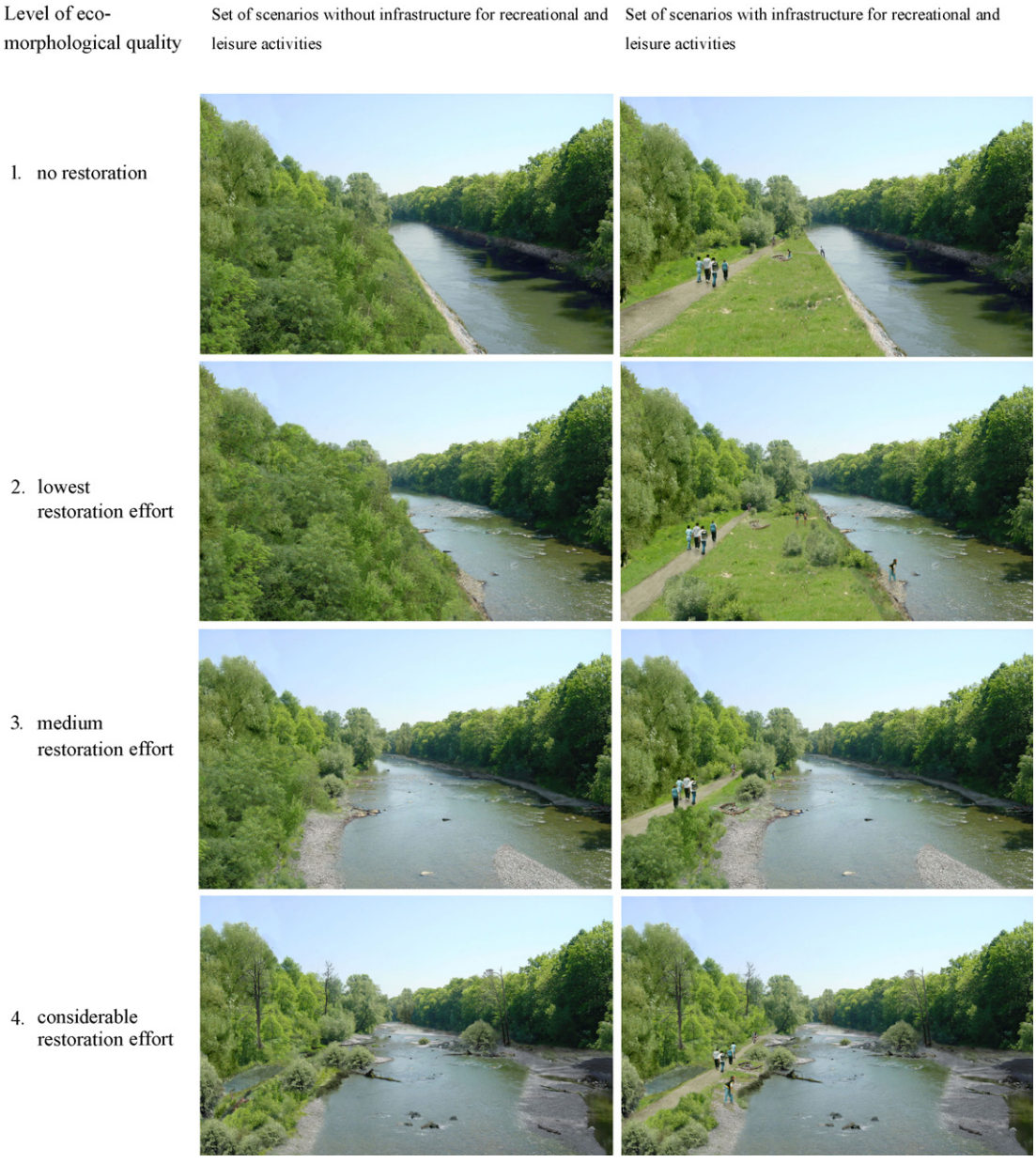

Fig. 1. Photographic simulations used in the survey.

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Table 1
Independent variables and their measurement

Key issues in designing river restoration projects	Independent variables	Assessment	Scaling
Ecological quality	Eco-morphological quality	Expert	Levels depicted in simulated scenarios (levels 1–4)
	Perceived naturalness	Research team	Survey item (scale 1–7)
Satisfaction of needs	Infrastructure for recreation and leisure purposes	Research team	Depicted in simulated scenarios (existing/not existing)
	Perceived satisfaction of needs	Research team	Survey item (scale 1–7)

Eight scenarios were designed in two sets. One set depicted four scenarios with increasing levels of restoration measures. The second set depicted the same four restoration measures with additional, clearly perceivable infrastructure for recreation and leisure activities (see Fig. 1).

To ensure that respondents were responding to the variables relevant to our research, the series of 8 simulations was generated by subjecting one single, real photograph of a Swiss river landscape to computer-aided editing with Adobe PhotoShop 5.0 software. The original photo was selected to contain a view of a river channel, its banks and some land along the banks. Therefore, the river scene was photographed slightly above eye-level.

The scenarios were designed to contain several independent variables (see Table 1). These were chosen to represent the most common practical questions arising when planning flood protection and restoration projects for rivers. They were also oriented to address the research questions outlined in the introduction. One of the practical questions was how ecologically sound river reaches should become. Another one dealt with the needs of the local public and how much these should be taken into consideration. Both ecological quality and satisfaction of public needs were hypothesized to have an effect on aesthetic preferences.

In order to analyse the ecological quality of restored river reaches, we selected the two independent variables "eco-morphological quality" and "perceived naturalness". "Eco-morphological quality" was chosen as a variable since it was already classified in the BUWAL's module-step concept (BUWAL, 1998), and provides a clear scale of measurement, corresponding to expert judgement of ecological quality. Another reason for choosing this concept is that eco-morphological quality can be visualised in photo scenarios more easily than other indicators of ecological quality, such as biodiversity. Eco-morphological criteria refer here to the structural state of river reaches, such as the width of the riverbed and the water surface, the level of the riverbed, how the embankment is built-up, and the quality and width of the banks. As in the "module-step concept", we used four levels of eco-morphological integrity. Table 2 shows the actual photo scenarios used in the survey and Table 3 indicates the physical characteristics of the river section depicted on the base photo (eco-morphological quality level 1) and also the alterations that were made for producing scenarios on eco-morphological quality levels 2–4 in detail.

The photographic simulations were first designed on the basis of the eco-morphological criteria of the module-step concept and then validated by experts. We asked three Swiss river engineering and restoration practitioners to give feedback on how well eco-morphological criteria on the different levels were represented in the visual material and incorporated recommended changes in the final versions of the photographic simulations.

The other independent variable to do with ecological quality – "naturalness as perceived by the public" – was chosen because previous studies suggest that it plays a role that is in a way intermediate between 'objectively' assessed ecological quality and 'subjective' aesthetic preferences (Nassauer, 1992, 2004; Gobster and Westphal, 2004; Hull et al., 2001). While "eco-morphological quality" was encoded in the photo simulations, "perceived naturalness" was rated by the respondents for each individual scenario.

To address the question of how much the needs of the public should be taken into consideration when planning river restoration projects, we selected the independent variables "visible infrastructure for human recreational and leisure purposes", and "satisfaction of needs as perceived by the public" on the basis of theoretical findings, as described in the introduction. For all scenarios where infrastructure for these purposes was shown, the number of people depicted in each was kept equal in order to avoid any bias due to perceived crowding (Kort et al., 2004).

Table 2
Socio-demographic characteristics of the survey respondents

Gender	%	Age (year)	%	Education (highest level)	%	Place of residence	%
Male	62.4	15–24	3.3	Primary school	3.3	Town	31.1
		25–39	24.2	Secondary	4.1	Agglomeration	26.6
Female	37.6	40–54	28.8	Grammar school	12.6	Countryside	38.4
		55–69	28.1	Apprenticeship/vocational school	36.9	Missing	3.9
		70 and more	15.4	Higher professional education	19.9		
				University/college	23.2		

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Table 3
Physical characteristics of the photo scenarios (base-line photo and alterations for respective scenario sets)

Eco-morpho-logical quality level	Classification according to module-step concept (BUWAL, 1998)	Average width of the river bed (in % of the width of the photograph)	Variability of the width of the water surface[a]	Visible level of engineering of the riverbed	Permeability and material of embankment base	Character of the banks[b]	Amount of deadwood/debris in the river bed[c]
1[d]	Artificial	40.8	None	Highly engineered, artificial	Impermeable, concrete blocks	Artifical to the river type	None/none
2	Semi-artificial	40.8	Constricted	Slightly engineered, semi-artificial	Partially permeable, concrete blocks with stretches of rubble and groins	Semi-artificial to the river type	Low/medium
3	Semi-natural	61.2	Pronounced	Slightly engineered, semi-artificial	Fully permeable, groins	Semi-natural to the river type	Low/high
4	Near-natural	71.4	Very pronounced	Not engineered, near-natural	Fully permeable, no use of artificial material to fix embankments	Near-natural to the river type	High/very high

[a] At medium water level; for the stretch of river visible in the scenarios.
[b] Banks defined as: area above and between the embankment base and intensively used land.
[c] Not included in the module-step concept.
[d] Base photo.

2.2. Questionnaire and sample

The written survey was designed on the basis of two previous case studies of the Swiss rivers Thur and Flaz/Inn and translated into the three official Swiss languages (German, French and Italian). It was sent to a random representative sample throughout Switzerland drawn up by the Swiss Federal Office of Statistics (BfS) on the basis of the national register of Swiss residents with a phone extension. 4000 copies of the questionnaire were mailed to this sample, together with a cover letter and a postage-paid return envelope on November 30, 2004. Of these, 3500 were deliverable. A reminder was sent out after 5 weeks to those people who had not until then responded. This resulted altogether in 1005 usable questionnaires, i.e. in a response rate of 28.7%.

The ten scenarios were displayed in random order on the central two pages of the questionnaire (A3 format). Photos were displayed in 300 dpi resolution (2438 pixel), optimized for print, 5×8.2 cm in size. They were not labelled. The respondents were asked to evaluate each of the depicted scenarios for the three questions:

- How much does the state of this river landscape appeal to you?
- How natural does it seem to you?
- How much does it correspond to your personal uses for a riverine landscape?

The survey also included questions on the respondents' socio-demographic characteristics (see Table 2).

Considerably more men than women responded to the survey. A one-way ANOVA, however, revealed no significant differences between the mean ratings of men and women. The age distribution of the sample was rather well balanced. An exception is the relatively high percentage of the oldest age group. The educational level overall is rather high, with a proportionally large percentage of people with vocational training. We found no significant differences according to the educational level or age group in the one-way ANOVA analysis of mean aesthetic preferences between the eight scenarios (all F-values <2.0; all $p > 0.05$).

The large number of respondents living in the countryside (38.4%), is a further characteristic of the sample. Since only approximately 30% of the whole Swiss population live in the countryside (BUWAL, 2003), rural residents appear to be over-represented in our survey. This is unusual, as the rural population tends to be rather under-represented in written questionnaire surveys. The over-representation in our study may be due to the fact that respondents had to report their place of residence themselves, which may not always have been accurate. We hypothesize that a relatively large number of respondents living in peri-urban zones have the tendency to think of themselves as living in a rural area rather than in an agglomeration because the term "agglomeration" often has negative connotations. Therefore, they tend to label their place of residence as "countryside". A closer check of postal codes in the survey supported this hypothesis and the representation of rural and urban residents in our sample does, in fact, conform with the Swiss norm. We

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found no significant differences between rural residents, urban residents and people living in agglomerations in the mean values of aesthetic preference in our one-way ANOVA (all F-values <2.2; all $p > 0.05$). On the basis of these statistical findings, we do not discuss these socio-demographic variables further in the results (Section 3.).

2.3. Data analysis and hypotheses

Survey data were analyzed using SPSS for Mac OSX version 11.0. The original SPSS data sheet contained only information on the variables "aesthetic preference", "perceived naturalness" and "perceived satisfaction of needs" for each scenario. To make the information on the other independent variables coded in the scenarios explicit and usable for SPSS analysis, we restructured the data set, creating the additional SPSS variables "eco-morphological quality" and "infrastructure". In this way, we obtained eight data entries for each respondent (since the survey contained 8 scenarios).

We used scatterplots to gain a visual impression of the kinds of relationships existing between variables. The discrete integral number values were made visible by adding normally distributed random numbers <0.2 to the respective data. Thus we obtained data clouds around the respective discrete values, which gave an impression of their quantity. Further, we calculated the mean and median values, standard deviations and variances for all independent variables.

The focus of the research questions of this paper is on the relationship between expert judgements of eco-morphological quality and public assessments of the aesthetic river scenarios. Therefore, we chose "aesthetic preference" as the major dependent variable for this study. The relationships between the independent variables and the overall dependent variable "aesthetic preference" were analysed by means of Mixed Models. This statistical method can be understood as an extension of a repeated measures ANOVA procedure, which is additionally able to account for subject or random factors. Such a subject or random factor had to be expected for this data set since each respondent rated the eight given scenarios according to his or her personal preference profile. Therefore, the variable "person" was entered into the model as a subject/random factor and the independent variables "eco-morphological quality", "infrastructure", "perceived naturalness" and "perceived satisfaction of needs" were treated as fixed factors.

In order to analyse the data set for differences between respondents' aesthetic preferences for scenarios on the single eco-morphological quality levels with and without infrastructure, we split the data set and computed four Mixed Models. This resulted in four dependent variables "aesthetic preference for scenarios on eco-morphological quality level 1", and on levels 2, 3 and 4.

When examining the influence of all independent variables and their interactions on "aesthetic preference" for all scenarios together, we first checked whether there was a subject/random effect in a Mixed Model. Since we could exclude such an effect, we conducted correlation analyses of the independent variables and afterwards a principal components factor analysis. We used the resulting factor consisting of "perceived naturalness" and "satisfaction of needs", together with the other independent variables "eco-morphological quality" and "infrastructure", to compute a general Mixed Model of "aesthetic preference".

For all the independent variables the Kolmogorov–Smirnov statistics showed deviations from the normal distribution, but the large sample size ($N > 1000$) meant that the usual test procedures (t-tests and F-tests) were still valid (Bortz, 1999; Greene, 1997).

The data was analysed to test the following more general hypotheses derived from theory and previous studies on related subjects:

(1) Aesthetic assessments and eco-morphological quality are highly related (e.g. Daniel, 2001b). They are only weakly related, however, for higher levels of eco-morphological quality (Hands and Brown, 2002; Nassauer, 1993; Williams and Cary, 2002; Gobster and Westphal, 2004).
(2) There is no clear relationship between the eco-morphological quality and perceived naturalness of the different scenarios (Özguner and Kendle, 2004).
(3) Perceived naturalness is closely related to aesthetic preference (Nassauer, 1992; Gobster and Westphal, 2004; Hull et al., 2001; Purcell and Lamb, 1998).
(4) Perceived satisfaction of needs and the infrastructure of restoration scenarios have a significant positive influence on aesthetic preference (Zedler and Leach, 1998; Booth, 2005; Gobster and Westphal, 2004; Junker et al., 2003).
(5) All of the factors mentioned above contribute significantly to a model of aesthetic preference.

3. Results

3.1. Eco-morphological quality and aesthetic preference

The scatterplots (Fig. 2(a and b)) indicate that scenario sets with a high degree of eco-morphological quality for scenarios both with and without visible infrastructure are preferred aesthetically to those of lower quality. This is supported by the mean values shown in Table 4.

A Mixed Model was used with the fixed factors "eco-morphological quality" and "infrastructure", where a subject effect is accounted for (Estimate = 0.41, S.D. = 3.0E−02). This revealed significant effects on aesthetic preference only for "eco-morphological quality" and together with "infrastructure", but not for "infrastructure" as a single variable.

($F^{(\text{eco-morphological quality})} = 1427.8$, Sig. = 0.000; $F^{(\text{eco-morphological quality} \times \text{infrastructure})} = 19.5$, Sig. = 0.000); $F^{(\text{infrastructure})} = 0.9$, Sig. = 0.337). Therefore, further analysis was undertaken separately for scenarios with and without infrastructure.

The Mixed Models for these two scenarios sets showed that "eco-morphological quality" has a significant effect on "aesthetic preference", and that there are significant differences between scenarios with eco-morphological quality levels one and two in comparison to aesthetic preferences for scenarios on eco-morphological level four (Table 4). We found no significant differences between the eco-morphological quality levels

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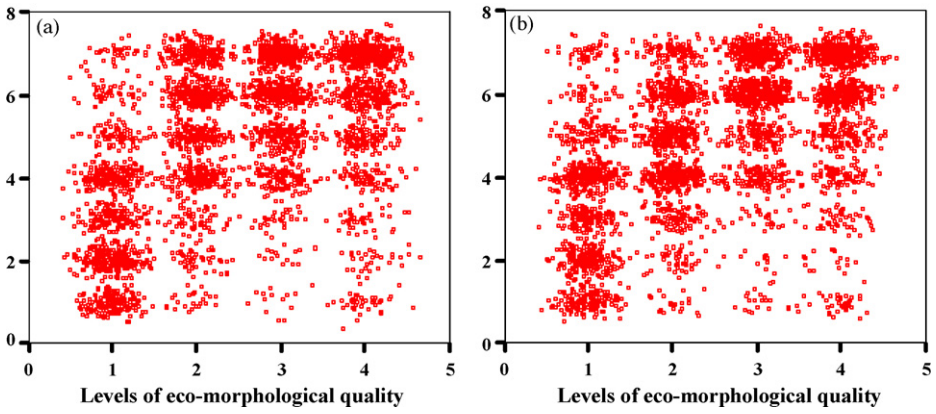

Fig. 2. Scatterplot of eco-morphological quality versus aesthetic preference for scenario sets (a) without infrastructure and (b) with infrastructure.

Table 4
Mixed Models of the effects of the fixed factor "eco-morphological quality" on "aesthetic preference" and estimates of fixed effects for single levels of "eco-morphological quality"; descriptors of "aesthetic preference"

Eco-morphological quality	Scenarios without infrastructure ($N = 3874$), fixed effects					Scenarios with infrastructure ($N = 3879$), fixed effects				
	F (792.3)			Sig. (0.000)		F (669.7)			Sig. (0.000)	
Levels	Mean	S.D.	Estimate	t	Sig.	Mean	S.D.	Estimate	t	Sig.
1	3.03	1.59	−2.68	−42.4	0.000	3.28	1.66	−2.41	−38.8	0.000
2	5.17	1.57	−0.54	−8.6	0.000	4.75	1.43	−0.94	−15.1	0.000
3	5.63	1.34	−8.65E−02	−1.4	0.171	5.69	1.37	−6.20E−03	−0.1	0.920
4	5.71	1.63	0			5.69	1.58	0		

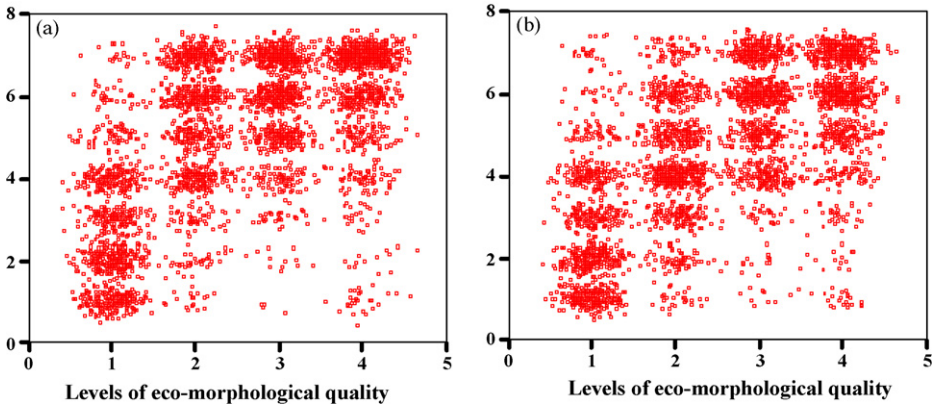

Fig. 3. Scatterplots of eco-morphological quality versus perceived naturalness for scenario sets (a) without infrastructure and (b) with infrastructure.

Table 5
Mixed Models of the effects of the fixed factor "eco-morphological quality" on "perceived naturalness" and estimates of fixed effects for single levels of "eco-morphological quality"; descriptors of "perceived naturalness"

Eco-morphological quality	Scenarios without infrastructure ($N = 3773$), fixed effects					Scenarios with infrastructure ($N = 3785$), fixed effects				
	F (1257.3)			Sig. (0.000)		F (1201.8)			Sig. (0.000)	
Levels	Mean	S.D.	Estimate	t	Sig.	Mean	S.D.	Estimate	t	Sig.
1	2.77	1.50	−3.27	−54.3	0.000	2.66	1.49	−3.11	−53.7	0.000
2	5.34	1.53	−0.69	−11.6	0.000	4.42	1.41	−1.36	−23.5	0.000
3	5.82	1.22	−0.22	−3.7	0.000	5.54	1.29	−0.24	−4.1	0.000
4	6.03	1.45	0			5.77	1.38	0		

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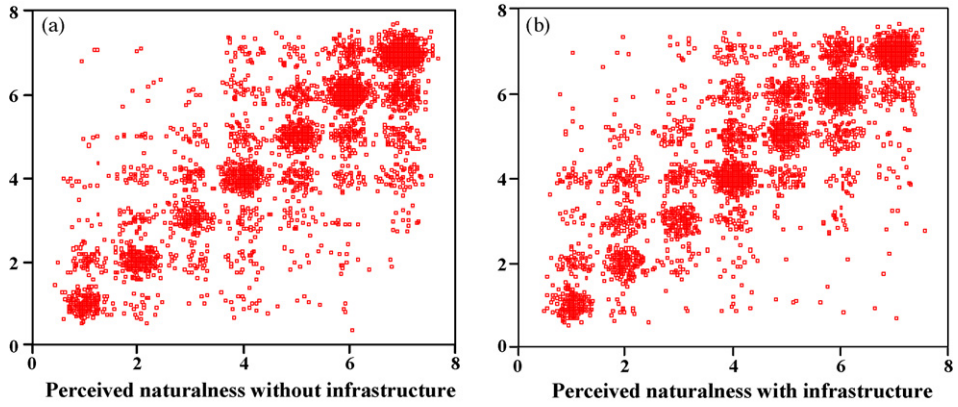

Fig. 4. Scatterplots of perceived naturalness versus aesthetic preferences for scenario sets (a) without infrastructure and (b) with infrastructure.

three and four for the scenarios with and without infrastructure.

Overall, the results support the hypothesis that aesthetic preferences are related positively to eco-morphological quality. They do not confirm findings of previous studies that the highest levels of ecological quality were perceived to be less attractive than lower or medium ones (e.g. Gobster, 1994). On the contrary, the two higher levels of eco-morphological quality appear to have the most aesthetic appeal. Level two of eco-morphological quality, on the other hand, was perceived to be more attractive than we had expected.

3.2. Perceived naturalness and eco-morphological quality

As both the scatterplots (Fig. 3(a and b)) and the descriptors (Table 5) show, the perceived naturalness of scenario sets increased with higher levels of eco-morphological quality for scenarios both with and without infrastructure.

The scenario on eco-morphological quality level two without infrastructure was rated relatively high (mean: 5.34), which is similar to the pattern described in Section 3.1. The gap between the level one and level two scenarios is less apparent for scenarios with infrastructure. Further, respondents appear to detect a difference in naturalness between the level three and level four scenarios for both infrastructure categories.

A Mixed Model for all scenarios showed that "eco-morphological quality" ($F = 2365.9$, Sig. = 0.000), "infrastructure" ($F = 171.5$, Sig. = 0.000), and also their interaction ($F = 37.1$, Sig. = 0.000) had significant effects on "perceived naturalness". The Mixed Models for scenarios with and without infrastructure were examined separately because "eco-morphological quality" and "infrastructure" tend to interact considerably. Then we found significant differences between the "perceived naturalness" of the scenarios with eco-morphological quality levels four and three and also the lowest levels (see also Table 5).

Therefore, the second hypothesis that there would not be a clear relationship between the perceived naturalness of the different scenarios and their eco-morphological quality was not confirmed.

3.3. Perceived naturalness and aesthetic preferences

A very strong relationship between perceived naturalness and aesthetic preferences for scenarios both with and without infrastructure is visible in the scatterplots (Fig. 4(a and b)).

As a Mixed Model for all scenarios showed significant effects for "perceived naturalness", "infrastructure" and also their interaction ($F^{(\text{perceived naturalness})} = 3216.2$, Sig. = 0.000; $F^{(\text{infrastructure})} = 144.1$, Sig. = 0.000; $F^{(\text{perceived naturalness} \times \text{infrastructure})} = 6.7$, Sig. = 0.007), we calculated models for scenarios with and without infrastructure separately. They confirmed the strong relationship between

Table 6
Mixed Models of the effects of the fixed factor "perceived naturalness" on "aesthetic preference" and estimates of fixed effects for single levels of "perceived naturalness"

Perceived naturalness	Scenarios without infrastructure ($N = 3745$), fixed effects			Scenarios with infrastructure ($N = 3785$), fixed effects		
	F (2364.8)	Sig. (0.000)		F (2428.6)	Sig. (0.000)	
Levels	Estimate	t	Sig.	Estimate	t	Sig.
1	−5.00	−76.2	0.000	−5.02	−76.8	0.000
2	−4.04	−65.4	0.000	−3.87	−62.8	0.000
3	−3.23	−47.9	0.000	−3.09	−48.6	0.000
4	−2.31	−44.1	0.000	−2.35	−46.4	0.000
5	−1.55	−28.6	0.000	−1.42	−25.8	0.000
6	−0.71	−15.0	0.000	−0.75	−15.1	0.000
7	0			0		

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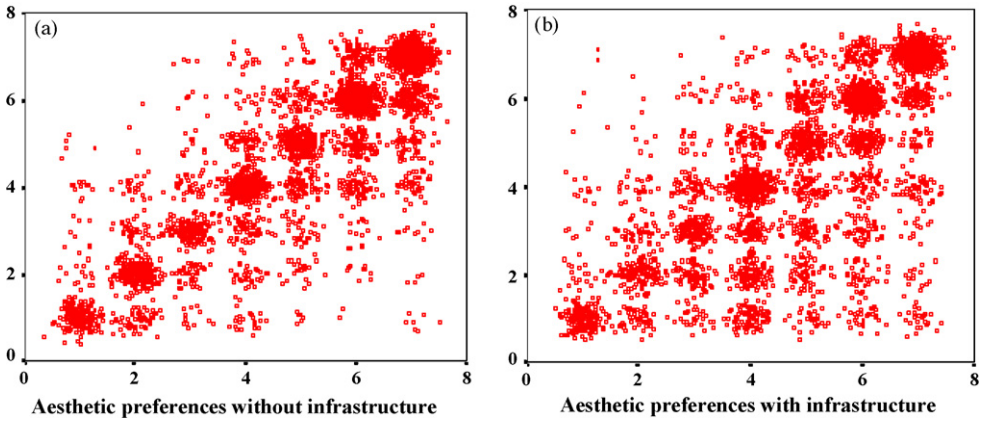

Fig. 5. Scatterplots of aesthetic preferences versus perceived satisfaction of needs for scenario sets (a) without infrastructure and (b) with infrastructure.

Table 7
Mixed Models of the effects of the fixed factor "satisfaction of needs" on "aesthetic preference" and estimates of fixed effects for single levels of "satisfaction of needs"

Satisfaction of needs	Scenarios without infrastructure ($N = 3718$), fixed effects			Scenarios with infrastructure ($N = 3892$), fixed effects		
	F (2412.8)	Sig. (0.000)		F (695.0)	Sig. (0.000)	
Levels	Estimate	t	Sig.	Estimate	t	Sig.
1	−5.10	−79.3	0.000	−3.87	−51.7	0.000
2	−4.24	−68.7	0.000	−3.22	−43.7	0.000
3	−3.35	−53.2	0.000	−2.82	−36.9	0.000
4	−2.43	−46.5	0.000	−2.36	−34.8	0.000
5	−1.58	−29.0	0.000	−1.60	−21.6	0.000
6	−0.70	−14.0	0.000	−0.87	−13.0	0.000
7	0			0		

perceived naturalness and respondents' aesthetic preferences (Table 6).

The results are, therefore, consistent with the hypothesis that perceived naturalness relates strongly to aesthetic preference. This strong relationship should certainly be kept in mind when examining the influence of all the independent variables on aesthetic preference.

3.4. Perceived satisfaction of needs and aesthetic preferences

A strong positive relationship between respondents' reported satisfaction of needs and their aesthetic assessments of scenario sets both with and without infrastructure is apparent in the scatterplots (Fig. 5(a and b)). It is less striking for scenarios with infrastructure.

A Mixed Model over all scenarios showed that both independent variables and also their interaction had significant effects ($F^{(\text{need satisfaction})} = 2143.6$, Sig. = 0.000; $F^{(\text{infrastructure})} = 146.3$, Sig. = 0.000 and $F^{(\text{need satisfaction} \times \text{infrastructure})} = 55.3$, Sig. = 0.000). Comparing the separate models for scenarios with and without infrastructure indicates a stronger effect of need satisfaction for scenarios without infrastructure than for scenarios with infrastructure (See F-values in Table 7).

In summary, the hypothesized strong positive relationship between perceived satisfaction of needs and aesthetic preferences was supported by our data.

3.5. Aesthetic preferences and infrastructure for recreational/leisure purposes

When examining the relationships between the single independent variables and perceived attractiveness, we looked at the scenarios with and without infrastructure separately. We analysed the effect of showing infrastructure in the photos on aesthetic preferences for all levels of eco-morphological quality taken together, and found no significant differences in mean values ($N = 7765$, $F = 0.636$, $p = 0.425$). When we computed Mixed Models for each level separately, however, we found significant differences for the two lower levels of eco-morphological quality, but not for the higher ones (Table 8). The difference for the scenarios at level 1 of eco-morphological quality was positive.

The hypothesis that the availability of infrastructure for recreational/leisure purposes will have significant positive influence on aesthetic preferences is, therefore,

Table 8
Mixed Models of the effects of the fixed factor "infrastructure" on "aesthetic preference" for specific levels of "eco-morphological quality"

Level eco-morphological quality	Estimate	t	Sig.
1	−0.24	−4.9	0.000
2	0.42	6.6	0.000
3	−6.12E−02	−1.4	0.161
4	1.74E−02	0.426	0.670

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Table 9
Pearson correlations for all scenarios

	Infrastructure	Eco-morphological quality	Perceived naturalness	Satisfaction of needs
Infrastructure	1			
Eco-morphological quality	0.000 (n.s.)	1		
Perceived naturalness	−0.102*	0.606*	1	
Satisfaction of needs	0.032**	0.515*	0.824*	1

* Two-tailed significance $p < 0.001$.
** Two-tailed significance $p < 0.01$.

disconfirmed for all scenarios taken together as well as for the scenarios with low to highest eco-morphological quality. It appears, however, to be confirmed for scenarios of the lowest eco-morphological quality.

3.6. Model of aesthetic preferences

Finally, we analysed the effect of all the independent variables on aesthetic preferences for all scenarios. We first examined them for multi-collinearity (Table 9).

Since we found perceived naturalness and satisfaction of needs to be collinear (tolerance: 0.075; conditions index: 26.2), these variables were reduced in a principal components factor analysis. This produced a single factor with an Eigenvalue of 1.82, which accounts for 91.18% of the variance in both variables. The loadings of the two variables "perceived naturalness" and "perceived satisfaction of needs" on this factor were both 0.96. Eco-morphological quality also correlated fairly well with perceived naturalness and satisfaction of needs, but all other measures of collinearity were negative.

Using this factor, as well as the independent variables "eco-morphological quality" and "infrastructure", we ran a Mixed Model. The combined factor of "perceived naturalness" and "satisfaction of needs" explained by far the largest share of variance in aesthetic preference. Compared to this factor the variables "eco-morphological quality" and "infrastructure" contributed only very little to explaining the variance in aesthetic preference (see *F*-values in Table 10).

Generally then, the hypothesis that all the independent variables will contribute significantly to a model of aesthetic preference needs to be modified to take into account the fact that the most relevant effect is due to "perceived naturalness" and "need satisfaction". "Eco-morphological quality" and "infrastructure", as well as the interaction between "eco-morphological quality" and the combined factor, explained only very little of the variance in aesthetic preference.

Table 10
Mixed Model over all scenarios; dependent variable "aesthetic preference"

Model Predictors	*F*	Sig.
Factor (perceived naturalness × satisfaction of needs)	15586.8	0.000
Eco-morphological quality	10.8	0.000
Infrastructure	14.3	0.000
Eco-morphological quality × factor	10.8	0.000
Eco-morphological quality × infrastructure	2.2	0.080
Infrastructure × factor	1.0	0.311

4. Discussion

All of the five research questions defined in the introduction could be answered on the basis of our data, but not all the hypotheses were confirmed.

(1) The main aim of our study was to analyse the relationship between how the public assess river restoration scenarios aesthetically and in terms of their naturalness. We measured naturalness according to four levels of eco-morphological quality and found aesthetic preferences to be positively related to eco-morphological quality, which agrees with our general hypothesis 1. Scenarios of higher eco-morphological quality appeared to be perceived as more attractive, which corresponds with House and Sangster's findings (1991) that public preferences are more compatible with nature conservation than is often thought and more than planning authorities tend to expect. Our results do not, however, support those of Hands and Brown (2002) and Nassauer (1993), who found that ecological quality, especially at higher levels, tended to be rated low for aesthetic preference. Eco-morphological level two seemed to be rated particularly high. Data indicates that even small efforts to restore rivers can make a positive difference to how the public assess the rivers' aesthetic appearance.
(2) Contrary to our expectations (hypothesis 2), public perceptions of the naturalness of different river restoration scenarios clearly relate to expert assessments of eco-morphological quality. Scenarios with just slight restoration measures implemented at eco-morphology level two tend to be perceived as much more natural than the scenarios at level one, which is shown as a fully channelled riverbed. Moreover, the ratings of the perceived naturalness of the scenarios at eco-morphological levels three and four tend to be similar.
(3) As hypothesised, there was a very strong relationship between perceived naturalness and aesthetic preference in our data. This supports the findings of Nassauer (1992), Gobster (2001), Hull et al. (2001) and Purcell and Lamb (1998). Perceived naturalness appears to relate much more closely to aesthetic preference than do expert assessments of eco-morphological quality (see Figs. 2(a and b) and 4(a and b)). That is, people's aesthetic preferences are shaped to a large extent by their perceptions of what is more natural. These perceptions are, however, not based on expert judgements but on what they consider to be natural.

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(4) How well a river restoration scenario is perceived to satisfy people's needs (and thus how suitable it is for recreation and leisure purposes) strongly influences – as expected – how positively they assess its aesthetic appearance. Interestingly, this relationship appears to be stronger for scenarios without infrastructure than for those with infrastructure.
(5) An unexpected result was how the presence of infrastructure affects aesthetic preferences. It only has a significant effect for the two lower levels of eco-morphological quality, which is positive only for level 1. This is probably because the presence of infrastructure is only viewed positively (and perceived to satisfy needs) if naturalness is perceived to be very low, which is the case for the scenarios at eco-morphology level 1. Our interpretation of this is that, if people do not perceive a scenario to be particularly natural, then they wish at least to have easy access to it.
(6) Finally, we asked how much the independent variables, "eco-morphological quality", "perceived naturalness", "satisfaction of needs" and "infrastructure for recreational/leisure purposes" can explain the aesthetic assessments of all the river restoration scenarios taken together. The principal components factor consisting of "perceived naturalness" and "satisfaction of needs" alone explains by far the largest proportion of the variance in aesthetic preference. With regard to all scenarios, "infrastructure" and "eco-morphological quality" contribute only very little to the model.

The specific design of this study restricts the generalisability of the findings. Since our research is based on a representative survey of Switzerland, our findings should be valid for other central European countries with similar cultures (in particular Germany, the Netherlands and Scandinavia). In these countries, as in Switzerland, people are particularly sensitive to environmental issues. It is doubtful, however, whether the results would be applicable in other world regions where the culture and awareness of environmental issues are rather different.

The specific methodology of this survey therefore limits to some extent the generalisability of the results. A strength of this study was that we could calibrate the restoration scenarios with the module-step concept (BUWAL, 1998) as a reference scale for varying states of ecological integrity. The scenarios were based, however, on our interpretations of the eco-morphological criteria that are included in this framework. Although experts validated the final design of the scenarios, their judgments were also subject to bias (in particular towards the existing scenario proposals). The module-step concept itself has to be seen as only an estimation, albeit made by experts, of degrees of naturalness of rivers. At this point, we also would like to point out that no clear consensus might exist what quality means for different eco-morphological levels for types of rivers differing from the prototypical meandering stretches with well defined banks, as depicted in our survey (e.g. arroyos of the deserts in the Southwest of the U.S. or undefined channels of recent glaciation in North America and Europe). A further limiting factor is that this study only focuses on eco-morphological quality as an indicator of environmental quality and does not take into account other indicators such as biodiversity or habitat diversity.

The design of the two scenarios sets differed in the visibility of infrastructure. It may have been that significant differences in people's aesthetic assessments were due to the different vegetation cover shown in the set of the land directly along the left bank of the river (forest versus meadow). We were able to test this hypothesis by including two further scenarios with eco-morphological quality levels one and two with a corresponding meadow band and without any infrastructure in the questionnaire. They were assessed significantly differently aesthetically from the scenarios with visible infrastructure at the same levels of eco-morphology quality.

Another limitation of this study is that we used multiple ratings for each photo scenario (for aesthetic preference, perceived naturalness and satisfaction of needs). We cannot fully exclude that this might have caused a certain amount of rating contamination, i.e. respondents might have rated scenarios they found to be more attractive also to be more natural and as more suited to their needs than those they rated lower. In follow-up studies the findings of this survey should be validated by means of having the photo test rated by different sub-samples for the three specific questions.

Finally, we would like to point out that people probably make first a purely aesthetic assessment when rating photos. Need satisfaction in terms of recreational and leisure activities tend to play less of a role in a photo survey whereas they would probably be very relevant if respondents were asked to judge river corridors on site. In further research perceived need satisfaction could be better measured using video-based experiments or assessed using verbally formulated quality criteria.

Our data identified a difference between naturalness, as expressed by eco-morphological criteria, on the one hand, and naturalness as perceived by people, on the other hand. Thus it would also be of interest to explore in future research whether informing the public about the effects of restoration projects on the naturalness of river landscapes would influence their aesthetic preferences.

5. Conclusions

The results of this study contribute to the general theoretical discourse on the relationship between objective ecological quality and people's aesthetic preferences, and also to river restoration policy and practical implementation.

From the theoretical point of view, we found that ecological quality, as measured here by eco-morphological criteria, relates more strongly than expected to aesthetic preferences. Moreover, the naturalness of a scenario, as perceived by the public, appears to influence aesthetic appeal even more strongly. This implies that people enjoy most what appears natural to them and only to a lesser degree what experts assess as most valuable in terms of ecological quality. The relatively strong relation ship between eco-morphological quality and aesthetics are very likely rather specific to river restorations. In other types of landscapes (e.g. agricultural land, prairies, wetlands) and in another context (e.g. urban) this relationship could be different, as previous studies

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indicate (Gobster et al., 2007; Williams and Cary, 2002; Parsons, 1995; Van den Berg and Vlek, 1998; Karjalainen, 1996). Thus, more work needs to be done before a more general statement on the relationship between aesthetics and ecological quality can be made.

Another finding of our study on river restoration scenarios was the strong relationship between perceived naturalness and aesthetic preferences. This goes along with previous research findings in other areas. Surprisingly, however, the differences we found between assessments of eco-morphological quality and perceived naturalness were mainly due to the proportionally large increase in aesthetic ratings from low for unrestored scenarios (level 1 of eco-morphological quality) to high for scenarios where the river corridor had been slightly restored (level 2 of eco-morphological quality).

The results of our study should be positive news for restoration planners and project teams working on practical restoration schemes. The strong positive relationship we found between ecological quality and aesthetic preferences indicates that there is no reason for concern about how the public will assess restored river corridors aesthetically. The most extensive restoration scenarios tend to have the highest aesthetic appeal. That means there will normally be considerable overlap between the objectives of restoration planners and project teams and what the public prefers aesthetically.

In practice, our findings imply that it would be more efficient to spend the same amount of money on restoring larger stretches of river to eco-morphological quality levels two to three (according to the module-step concept) than on more extensive restoration schemes of shorter stretches. From a cost-benefit perspective that also takes the public's aesthetic preferences into account, restoration endeavours up to eco-morphological quality level three appear to be the most efficient. Efforts to restore rivers up to level four will probably not result in much greater aesthetic appreciation and the public might well not support the additional costs of such projects.

The fact that perceived naturalness related so strongly to aesthetic assessments of river landscapes despite the clear gap between how the public and how experts perceived naturalness suggests that more effort should be made to inform the public about the impact of river restorations on the naturalness of rivers. People tend to value small restoration efforts. The potential gain in ecological quality brought about by restoring rivers to the highest possible level of eco-morphological quality needs, therefore, to be communicated more clearly and insistently.

The results of this are rather general. When planning actual restoration projects, it is important to recognise and analyse the specific local context. For example, the kind of infrastructure the public want for recreational and leisure activities could be much more important in some contexts than indicated in this study. Active local public participation and two-way communication in deciding about restoration objectives would be highly desirable. As our study shows, public aesthetic preferences tend to strongly support restoration objectives. Therefore, project planners should not stand back from exploiting this favourable aspect and should refer to local aesthetic assessments when planning restoration projects. We found no indications of obstacles towards a public ecology, as defined and called for by Hull and Robertson (2000) where "ecological scientists, professional environmental managers, and involved citizens are all stakeholders with an essential role to play in developing a body of managerially relevant environmental knowledge" – a public ecology that will "... facilitate the negotiation and construction of restoration and management goals" (Hull and Robertson, 2000). Such a public ecology is, we believe, still a worthwhile and realistic goal.

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Paper IV

JUNKER, B., FRICK, J. & M. BUCHECKER

What influences public attitudes toward river restorations?

In: Society and Natural Resources. Submitted.

What influences public attitudes toward river restorations?

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Abstract

Restoring river corridors has become a common practice to improve both flood protection and their own ecological quality. However, there is a lack of knowledge as to why the public approves or rejects river restoration projects. In order to examine the factors underlying public attitudes towards river restorations, we conducted a representative Switzerland-wide survey (N=1005). Statistical analysis of the data was used to test a conventional tripartite attitude-model consisting of cognitive, affective and behavioral factors. In a second step, the model was extended by social, procedural and flooding risk evaluation factors to examine their influence on attitude formation.

We found that the tripartite model factors were relevant, but that social and procedural factors also make a significant contribution to predicting attitudes toward river restorations. Interestingly however, social and procedural (and flooding risk evaluation) factors seem to only be additional predictors for negative attitudes, and not for positive attitudes. Overall, all factors used in this study were much more capable of explaining variance in negative attitudes than in positive attitudes toward river restorations.

The findings of this study help to better understand the formation of attitudes toward river restorations as an important part of landscape development. They also enhance managers' ability to avoid conflicts in regard to river restoration projects, and to promote their active public support.

Keywords: integrated water systems management, public attitude formation, river rehabilitation

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1. Introduction

The last few decades have been marked by a paradigmatic shift in the practice of river engineering (Boon et al. 2000, Bernhardt et al., 2005). The heavy human modification and channeling of rivers worldwide caused a massive loss of biodiversity (Hygum 2001, Johnson et al. 2001). It has thus now become common practice again to grant rivers more space thereby improving the quality of riverine natural habitats (Calow and Petts 1992; Eiseltova 1995). River restorations are today expected – often by law - to combine improved flood protection measures with the ecological rehabilitation of river corridors (Boon et al. 2000; European Commission 2000; BWG 2001; WBV 2000).

The issue of river restoration, however, is the subject of heated public debate and local conflicts. Discussions are fuelled by various factors, such as the feasible objectives of restoration projects, land use and cost-benefit considerations, differing conceptions of nature, the procedure for implementing restorations (i.e. public participation and decision-making) and the expected effects on the local river corridor. Several studies have shown that restoration projects are, in general, relatively well accepted after their realization (Junker and Buchecker 2006; WWF 2004; Bratrich 2004; Tunstall et al. 2000). Nevertheless, they frequently cause resistance and conflicts during the planning and decision-making phases (Zaugg 2003; Camenisch et al. 2001; Woolley and McGinnis 2000; Vining et al. 2000), which leads to cost-intensive delays or even the prevention of a project.

River engineering professionals, experts and scientists are required to identify appropriate flood management and restoration scenarios that not only meet the government guidelines and incorporate up-to date knowledge about ecological and hydro-morphological relationships, but also receive support from the public. Knowledge about the factors influencing public attitudes toward river restorations would therefore contribute to finding widely acceptable solutions and also help to identify potential reasons for opposition. Very little is known until now about why the public approves or rejects river restoration projects. It is, therefore, the aim of this study to understand the factors underlying public attitudes towards river restorations.

An attitude can be defined as a positive or negative evaluation of any attitude object. Such objects can be people, objects, events, activities, ideas, or just about anything in our environment (Zimbardo et al. 1999, p. 745). Theoretically, attitudes can be inferred from cognitive, affective and behavioral responses to the attitude-object (Eagly and Chaiken 1993; Ajzen 1989; McGuire 1985, Ajzen and Fishbein 1980; Jackson and Paunonen 1985; Katz 1960; Rosenberg and Hovland 1960; Kahnemann and Tversky 1973). Cognitive

components of attitudes are, according to models and studies in social psychology, what people perceive as outcomes of actions (Anderson 1991; Fishbein and Ajzen 1975), their value orientations (Vaske and Donnelly 1999; Fulton et al. 1996; Bright et al. 2000) and their knowledge about the attitude-object (Eagly and Chaiken 1998; Bar-Tal and Kruglanski 1988). Affective components include feelings, emotions and moods that people experience in relation to an object or behaviour (Eagly and Chaiken 1998, Ajzen 1989; Bright et al. 2002; Bright and Manfredo 1996). Finally, the inclusion of a behavioral component is based on the finding that people hold attitudes that are consistent with prior volitional behavior (Bem 1972; Ajzen 1989, 1993).

Bright et al. (2002) empirically tested a tripartite model consisting of the cognitive, affective and behavioral components for general ecological restoration in the Chicago area. They found that this model appropriately addresses attitudes toward this issue. Perceptions of restoration outcomes are an especially important predictor of attitude. The role of other cognitive, affective and behavioral factors varied according to whether the attitudes were positive or negative.

The authors point out that factors extending beyond this tripartite model, consisting of cognitive, emotional and behavioral factors such as "perceptions about individuals and agencies carrying out restoration activities, …, and other factors should be explored to more fully understand differences [in attitudes towards restorations]" (Bright et al. 2002). Other studies, theories, and our own qualitative pre-study research in combination with practical considerations indicate that additional factors are relevant in the formation of attitudes to the issue of restoration.

Some of the recent literature suggests that not only cognitive, affective and behavioral factors influence attitudes but so too do social, procedural and risk evaluation factors. According to Fishbein and Ajzen's theory of planned behavior (1985, 1987), social factors such as subjective norms can influence attitudes (see also Fields and Schuman 1976). Other authors suggest that procedural factors play a role in attitude formation, such as trust in the planning and communication agencies (Herkner 1991; Aerni 1999) or experience with previous decision-making and applied communication strategies (Petty et al.1983; Rentsch 1988; Baschung 2003; Hubacher 2000; Schuster 2003). Risk evaluation might be a factor, especially for attitudes to do with natural resource management and restoration. Several authors have found relationships between perceived risks and attitude formation (Lima 2006; Dramstad et al. 2001). Figure 1 gives an overview of the tripartite factors and the additional social, procedural and risk evaluation factors in a concept model for river restorations.

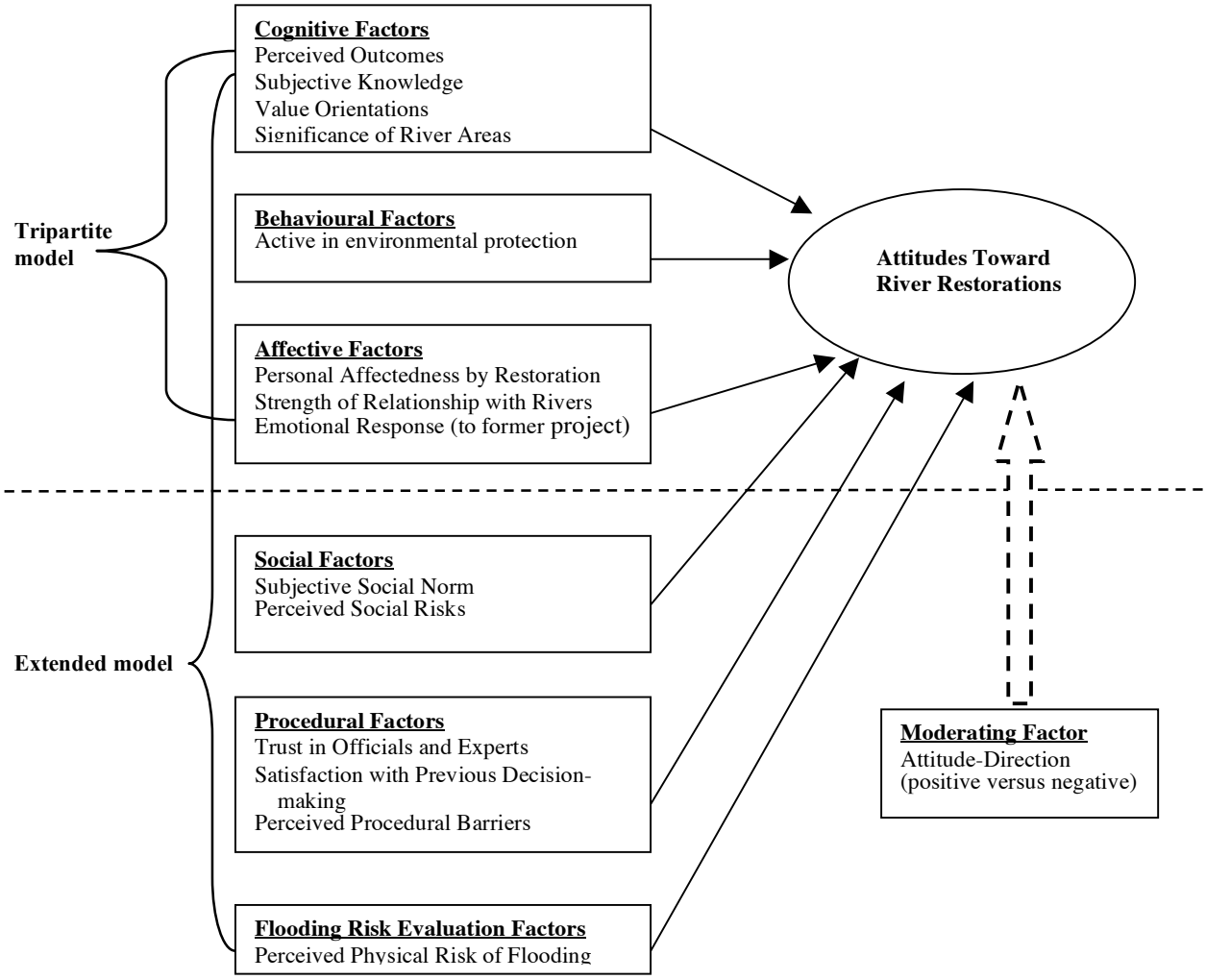

Fig. 1. Conceptual Model of Attitudes toward River Restorations based on a tripartite model (top) and the additional factors in an extended model (bottom). The model factors are depicted as they were operationalized in this study.

Factors extending beyond the tripartite model can also be derived from practical considerations about the specific context of river restorations. Social factors are likely to influence attitudes to river restorations because river corridors are a significant part of people's everyday living space and history with a multitude of uses. As previous studies have shown, rivers are part of people's local living space and thus are important social spaces (Junker and Buchecker 2006; Junker et al. in press; Tunstall et al. 2000). The history of rivers must be kept in mind when exploring attitudes towards their restorations. In contrast to other landscape elements, rivers have often been deliberately modified in the past and are often perceived as symbols of the art of engineering and of successful human battle against

threatening natural forces (Speich 2002, Zaugg Stern 2006). Another characteristic of river corridors is that they have a multitude of public (e.g. recreation) and private (e.g. agricultural) uses that are in most places spatially highly interlinked. All of these characteristic lead to the hypothesis that the social significance of the river spaces, the subjective social norm, and perceived social risks (e.g. conflicts in the community, threat to local farmers' existence) play a role when public attitudes toward river restorations are formed.

These specific framing conditions for river restoration practice indicate also the importance of procedural factors for attitude formation. Since river corridors are very significant for locals as part of their daily living space, it can be assumed that restoration project proposals that imply changing this space are likely to be perceived as threatening local autonomy and the status quo situation that people are used to (Camenisch et al. 2001, Knall 2006, Zaugg 2003). The multitude of uses of river corridors and thus the diversity of interests affected indicate a need for a widely inclusive and active stakeholder involvement in decision-making (Junker and Buchecker in press). Therefore, the way restoration projects are negotiated, the past experiences locals have had with cantonal and federal decision-making, and public trust in experts and officials are likely to influence public attitudes toward restoration projects.

The nature of rivers, modern river management practice and the multitude of uses of river corridors mean that the perceived flooding risk is also relevant. While rivers have always been spaces with a risk of flooding, people tend to settle closer to river corridors after rivers are modified and channeled (Zaugg Stern 2006). Restoring rivers so that they are closer to their pre-engineered states frequently makes people feel more insecure about the flood protection capacity of these settled or publicly used spaces. Both past flooding events and perceived outcomes of river restoration on flood protection efficiency are thus likely to influence public restoration attitudes (Tunstall et al., 2000).

To date there has been little, if any empirical research on attitudes to river restorations. This study therefore aims to test whether a tripartite model consisting of cognitive, behavioral and affective factors can sufficiently describe public attitudes towards river restorations (see Bright et al. 2002) and whether additional procedural, social and risk evaluation factors can also help to explain them (Fig. 1). Bright et al. (2002)'s study on ecological restoration suggests it would also be of interest to examine whether the influences on positive attitudes are different from the influences on negative attitudes.

The specific research objectives of this study were:

1. To determine whether attitudes toward river restorations can be explained by cognitive, affective and behavioral factors.

2. To determine whether adding social, procedural and flooding risk evaluation factors to the tripartite model can help to explain public attitudes toward river restorations.
3. To determine whether factors influencing positive public attitudes toward river restorations differed from the factors influencing negative public attitudes.

2. Methods

2.1. Sampling and Data Collection

The questionnaire for the standardized written survey was designed according to the Dillman protocol (Dillmann 1978; Dillmann 2000). It was pre-tested and sent to a random representative sample throughout Switzerland drawn from the total number of Swiss residents with a phone registry entry. 4000 copies of the questionnaire were mailed to this sample, together with a covering letter and a stamped addressed envelope in fall 2004. Of these, 3500 were deliverable. A reminder was sent out after five weeks to those people who had not responded until then. The return rate was 28.7% (N=1005).

To investigate if the sample was biased, an additional phone survey was conducted with a shortened version of the questionnaire focusing on attitudes toward restoration projects (see also Junker and Buchecker in press). Here the responses rate was 39% (N=2016). There were no significant difference in expressed attitudes toward river restorations from those in the written survey.

Several socio-demographic characteristics of the respondents were elicited (Table 1). Considerably more men than women responded, possibly because the phone survey reached more men. A one-way ANOVA, however, revealed no significant differences between the mean attitude ratings of men and women ($F(1,976) = 2.75$; $p = .10$). In terms of age, the survey has a relatively representative distribution (see Table 2). An exception is the relatively high percentage of the oldest age group. The educational level overall is rather high, with a proportionally large percentage of people with vocational training. We found no significant differences according to the educational level ($F(5,968) = 1.44$, $p = .21$) or age group ($F(4,946) = 0.85$, $p = .49$) with regard to attitudes toward restoration.

Table 1. Socio-demographic characteristics of survey respondents

Gender	**%**	**Age Category**	**%**	**Education (highest level)**	**%**
Male	62	15-24	3	Primary school	3
Female	38	25-39	24	Secondary school	4
		40-54	29	Grammar school	13

		55-69	28	Apprenticeship/vocational school	37
		>70	16	Higher professional education	20
				University/college	23

2.2. Measurement instruments

Unless stated otherwise, the instruments were based on the results of a qualitative exploratory study in which 40 people were interviewed. Interviewees were selected from locals, members of stakeholder groups and of the particular river project team from restoration projects along the Rivers Thur and Flaz/Inn (Junker and Buchecker in press). The decision-making process for the River Thur project was also observed (perimeter Weinfelden/Bürglen).

The model variables were assessed using either single items or means indices (scales) of three to five items (see Table 2). The internal consistency of all scales was tested using Cronbach's alpha. The alpha-values for all scales were larger than .60 which is considered to be adequate for new scale development (Nunnally and Bernstein 1994).

Two constructs were assessed using more than five items. With these and two other constructs where possible sub-dimensions were expected, principal component analysis (PCA) using Varimax rotation was applied (see Table 2). If the PCA indicated multidimensionality, the mean scores of the items constituting the sub-dimensions (i.e. items with factor loadings of at least 0.40) were used as independent variables in the analysis.

2.2.1. Attitudes toward restorations

The dependent variable of the investigation was attitude to river restorations. Prior to responding to four questionnaire items, respondents read an information passage about river restorations:

"In recent years, several projects have been initiated in Switzerland aiming to improve flood protection by giving rivers more space. Such measures (called restorations) are at the same time supposed to re-establish natural habitats for animals and plants. To re-create such near natural living space, however, the rivers and creeks would need to have available two to three times more space than they have today. Such restorations may mean thus the loss of land that was used in the past for agricultural production. Accordingly, such river projects are a controversial topic. That is why your opinion about them is important to us."

Subsequently, respondents were asked how much they were in favor of: 1) restoring rivers in Switzerland for flood protection and ecological rehabilitation; 2) restoring rivers in their own

neighborhood for flood protection and ecological rehabilitation; 3) restoring rivers in Switzerland even if flood protection is not a priority; and 4) restoring rivers in their own neighborhood even if flood protection is not a priority. They could respond on a 4-point scale ranging from "strongly opposed" to "strongly in favor". A mean index was calculated for these four items (Cronbach's alpha =.87). In addition, respondents were assigned to either the positive or negative attitude group based on the mean split of this index.

2.2.2. Cognitive Factors

Perceived Outcomes of River Restorations. Perceived Outcomes were measured using 12 items, taken from all potential long-term outcomes of a river restoration in the respondent's own neighborhood identified by Junker and Buchecker (in press) and from the literature on river restoration. A 7-point response scale was used ranging from "serious deterioration", and "no change" to "great improvement". PCA revealed two factors for perceived outcomes (i.e. outcomes related to functional river aspects and outcomes related to the river as a local living space (see Table 2).

Table 2. Overview of accumulated items used for the models' variables

Model factor	**Name of variable (and Cronbach's Alpha)**	**Item**
Cognitive	Perceived outcomes (living space) (.91)	**If a river in your region is due to be restored, which long-termed outcomes of such a project would you expect for the following aspects?**
		… recreational opportunities
		… naturalness along the river
		… naturalness in the river
		… diversity of plants and animals
		… quality of life
		… beauty of the river space
		… feeling at home there
	Perceived outcomes (functional) (.66)	… accessibility of river
		… flood protection
		… agricultural use
		… economic development of the community
		… maintenance costs for the river
	Subjective knowledge (.87)	**How well do you feel informed about …**
		… the topic of river restoration?
		… how one tries to provide flood protection?
		… what has happened along the river until now?
		… what lives in and along the river?
		… how the parts of nature interact?
	Value orientations (.77)	**What do you think of the following statements?**
		There are plenty of natural rivers and society does not have to waste precious money to "restore" rivers.
		Restored nature is false nature. Humans cannot cannot re-establishe naturalness.
		Restored rivers are not a luxury, but a necessity. (recoded)
		Restorations are in my opinion too expensive.

		If something is done to improve flood protection, the river in question should be restored at the same time. (recoded)
Cognitive	Significance of river space (living space) (.89)	**What significance has the river in your neighborhood for you personally as …**
		… recreational area
		… area for experiencing nature
		… source of life
		… ecologically valuable space
		… space for peace and quiet
		… part of home
		… something belonging to me
		… part of my living space
	Significance of river space (functional) (.65)	… source of danger
		… space for economic use
		… channel/drainage
		… engineering achievement
Social	Perceived social risks (.72)	**What reasons are there in your opinion for not restoring a river in your neighborhood?**
		… The costs for the community would be too high.
		… It would cause conflicts in my community.
		… Decision of the cantonal and federal offices would reduce the autonomy of the community.
		… The existence of land-users in the river corridor would be threatened.
		… The citizens of the community would not be able to participate in a sufficient way in the planning.
Procedural	Perceived procedural barriers (.72)	**What could in your opinion prevent river restorations?**
		.. Affected people refuse to make available the land needed even if recompensated
		.. Lack of federal and cantonal funding
		.. Opposition of the local public
		.. Political opposition of stakeholder groups
		.. Restricted legal possibilities to enforce river restorations (e.g. to expropriate land)

Subjective Knowledge. Bright et al. (2002) measured respondents' objective knowledge according to their performance on a seven-item fact-based test. In contrast, we decided to measure subjective knowledge as rated by the respondents (cf. Ellen 1994), since this requires shorter scales than a reliable and valid performance test. Respondents were asked to indicate how well they thought they were informed about the five topics in Table 2 (using a 5-point response option ranging from "very well" to "very badly").

Value Orientations. Value orientations were measured using five basic belief statements (Table 2). These were derived from the Q-sort study of value orientations to restoration by Wooley and McGinnis (2000) and the qualitative interviews during the preparatory case studies. Respondents stated their agreement to the statements (5-point scale from "agree fully" to "not agree at all").

Significance of river space. The items covered 12 aspects of significance. Respondents rated the personal significance of these aspects (on a 5-point scale from "very little significance"

to very much significance"). PCA revealed two factors related to significance of the river spaces: functional aspects and aspects related to the river as a local living space, see Table 2).

2.2.3. Affective Factors

To measure the respondents' *personal relationship with rivers*, we used three single items. Firstly, we asked respondents "how strong is your personal relationship to rivers or perhaps only one particular river?" with answers recorded on a 4-point scale ranging from very weak to very strong. Secondly, respondents stated how strongly they would be *personally affected by a* potential *river restoration project* in their own neighborhood on a 5-point-scale ranging from very little to very strongly. Thirdly, we asked those respondents who had already experienced a river restoration project in their region which general feeling they associated with this project (*emotional response to a previous project*) according to a 5-point scale ranging from "a very bad feeling" to "a very good feeling".

2.2.4. Behavioral Factor

Using a yes/no format, respondents indicated whether they were currently members of an environmental organization, whether they actively collaborated in a nature conservation group and whether they were professionally active in the environmental field. In PCA, variables were found to constitue one dimension (Cronbach's Alpha=.75). The resulting mean variable used in the analysis of the different models was labeled "*Active in environmental protection*".

2.2.5. Social factors

To assess what *social norms* respondents perceived to be involved in attitudes toward river restorations, we asked "How do you judge the following statement? People in my community think the idea to restore rivers in our region… (single item answers given on a 5-point scale ranging from "very bad" to "very good").

We incorporated all aspects of *perceived social risks* associated with restoration projects found in the qualitative case study interviews and our observation of the decision-making process in the River Thur project. Consequently, social risks were operationalized according to responses to five statements relating to a hypothetical restoration project in the respondents' neighborhood (see Table 2). Responses were coded on a 4-point scale ranging from "agree fully to "not agree at all"). The PCA results indicated that these items constituted only one factor.

2.2.6. Procedural Factors

Three variables constituted the procedural factor. First, we measured with 5 items the *trust* respondents said they had in federal officials, cantonal and local authority, as well as in planners, and river engineering experts with regard to their ability to make competent

decisions about the future of rivers. Responses were graded on a 5-point response scale ranging from "trust very little" to "trust very much"). Secondly, we assessed respondents' satisfaction with the way important decisions in the community had been made during the past 10 years (single item "*satisfaction with decision-making*" with a 5-point scale from "very dissatisfied" to "very satisfied"). Thirdly, five statements (see Table 2) measured perceived procedural barriers on a 4-point scale from very unlikely to very likely. The results were found to be one-dimensional.

2.2.7. Risk evaluation.

Respondents were asked to judge the *physical risk of flooding* of the river stretch closest where they lived (single item on a 5-point scale from very low to very high).

2.3. Statistical analysis

We used regression models in order to identify the factors influencing attitudes to river restorations and the strength of their influence. Since we computed mean values for four items measuring attitudes to river restorations (see section 2.2.1.), the dependent variable can be regarded as linear, and we used linear regression. Missing data were deleted case-wise and the regression method was stepwise. The models were tested for multi-collinearity, normality of the residuals, and heterocedasticity. None of the models showed any multi-collinearity problem (tolerance values > 0.5 and variance inflation factors (VIF) <1.7; cf. Menard 1995; Myers 1990; Brosius 2004) or violations of homocedasticity (A Levene test indicated no significant differences in variances between high and low predicted values).

3. Results

The first research question was to determine whether attitudes toward river restorations were related to cognitive, affective and behavioral factors, and the second whether social, flooding risk evaluation and procedural factors added to the tripartite model in explaining public attitudes toward river restorations. Table 3 summarizes the results of the first regression analyses using the tripartite model and the extended model. It shows that cognitive and affective factors explained approximately 40% of the variance in attitude towards restoration in the model that included only the tripartite factors.

In the extended model that incorporated additional factors (i.e. social, procedural and risk evaluation factors), "subjective social norm", "perceived social risks" and "perceived

procedural barriers" had a significant effect, although the explained variance rose only slightly.

Table 3. Standardized regression weights of the tripartite model and the extended model on attitudes toward river restoration, calculated for the full sample

Factor group	**Independent variables**	**tripartite model**	**extended model**
Cognitive	Perceived Outcome (living space)	0.174***	0.125**
	Perceived Outcome (functional)	-	-
	Subjective Knowledge	-	-
	Value Orientations	0.430***	0.389***
	Significance of River Space (living space)	-	-
	Significance of River Space (functional)	0.094**	0.088*
Affective	Personal Relationship with Rivers	-	-
	Personal Affectedness by Restoration	-	-
	Emotional Response (to former project)	0.152**	0.150**
Behavioral	Active in Environmental Protection	0.106**	0.095*
Social	Subjective Social Norm		0.127**
	Perceived Social Risks		0.094*
Procedural	Trust in Officials and Experts		-
	Satisfaction with Previous Decision-making		-
	Perceived Procedural Barriers		0.159***
Risk evaluation	Perceived Physical Risk of Flooding		-
	Model summary	R^2: 40%	R^2: 44%

N= 990; * p < .05. ** p<.01. *** p<.001. – p>= .05; a blank means that the respective variable was not included in the model.

The question whether factors influencing positive public attitudes toward river restoration differed from the factors influencing negative public attitudes was addressed using a set of four more regression models (Table 4). Respondents' values and emotional responses to former restoration projects significantly influenced both positive and negative attitudes toward restoration. Both factors – values and emotional responses – had stronger effects on negative than on positive attitudes.

A notable difference was that positive attitudes tended to be affected by perceived outcomes affecting the living space while, negative attitudes were predicted instead by perceived outcomes with functional aspects. Further, negative attitudes show to be significantly influenced by respondents' activity in environmental protection (behavioral factor) while positive attitudes do not show such an effect.

Table 4. Standardized regression weights of the tripartite model and the extended model on attitudes toward river restoration, calculated for the positive attitude sample and the negative attitude sample.

		Positive attitude models		**Negative attitude models**	
Factor group	**Independent variables**	**Tripartite model**	**Extended model**	**Tripartite model**	**Extended model**
Cognitive	Perceived Outcome (living space)	0.131*	0.131*	-	-
	Perceived Outcome (functional)	-	-	0.260***	0.182**
	Subjective Knowledge	-	-	-	-
	Value Orientations	0.287***	0.287***	0.414***	0.360***
	Significance of River Space (living space)	-	-	-	-
	Significance of River Space (functional)	-	-	-	-
Affective	Personal Relationship with Rivers	-	-	-	-
	Personal Affectedness by Restoration	-	-	-	-
	Emotional Response (to former project)	0.143**	0.143**	0.289**	0.280**
Behavioral	Active in Environmental Protection	-	-	0.123**	0.127**
Social	Subjective Social Norm		-		0.286***
	Perceived Social Risks		-		-
Procedural	Trust in Officials and Experts		-		-
	Satisfaction with Previous Decision-making		-		0.136*
	Perceived Procedural Barriers		-		0.174*
Risk evaluation	Perceived Physical Risk of Flooding		-		0.146*
	Model summary	R^2: 17% F (332): 22.35***	R^2: 17% F(239): 16.01***	R^2: 46% F (147): 30.92***	R^2: 61% F (96): 19.1***

N(positive attitude models)= 687; N(negative attitude models)= 303; * p < .05. ** p<.01. *** p<.001. – p>= .05; a blank means that the respective variable was not included in the model.

The extended model made no additional contribution to explaining the variance in positive attitudes toward restoration compared to the tripartite model. In the negative attitude group, however, the extended model could explain approximately 15% more of the attitude variance. Thus, social and procedural factors seem to be additional predictors only for negative attitudes, but not for positive attitudes. Overall, all factors used in this study were much more capable of explaining variance in negative attitudes than in positive attitudes toward river restorations.

Discussion:

This paper explores which factors influence attitude formation toward river restoration. We found that the tripartite model factors were relevant, but that social and procedural factors make also a significant contribution, especially for explaining variance in negative attitudes. Our results on attitudes toward river restoration in Switzerland corresponded with the findings of Bright et al. (2000) on general ecological restoration attitudes in the Chicago area in highlighting the importance of perceived outcomes, values and emotions as predictors of attitude. These factors were the only significant ones for positive attitude. For negative

attitudes, it was apparent that respondents` impressions of how their own community viewed river restorations, i.e. the subjective norm, the social risks, and the procedural barriers they associate with restoration projects were also important factors, and so was their satisfaction with previous decision-making and perception of flooding risks. Therefore it seems justified to extend the tripartite model and include social and procedural factors when analyzing attitude formation regarding river restorations. Other qualitative and quantitative studies on the factors influencing acceptance of nature conservation areas (Schenk 2000; Toscan 2007; Müller/Kollmair 2004) have also highlighted the relevance of social and procedural factors. Another important finding of our study was that the outcomes of river restorations likely to affect respondents` living space (e.g. recreational opportunities, naturalness of river space, quality of life) played a role in predicting river restoration attitudes in general including positive attitudes. Outcomes to do with functional aspects of river corridors (e.g. flood protection, agricultural use, maintenance costs), however, significantly influenced negative attitudes. This result appears to be in line with cognitive dissonance theory in terms of how selectively people gather information (Frey 1981, 1986; Kleinhesselink and Edwards 1975; Herkner 1991). Our interpretation of this finding is that respondents with positive attitudes might selectively take in information they associate with positive outcomes of river restoration, such as an increase in landscape beauty, in recreational opportunities and local life quality. Respondents already holding negative attitudes might, on the other hand, be prone to select "negative" information concerning functional aspects and use factual arguments such as: flood protection will decrease, or farmers will have to give up their land, etc.). These could provide a less contestable rationalization of their views than aesthetic or quality of life arguments, e.g. to do with landscape beauty.

Not only are the factors we found to be relevant predictors for attitudes toward river restorations of interest, but so too are those that did not significantly influence attitudes. Contrary to former research findings (Tunstall et al. 1997), the risk of flooding, for example, did not play a significant role in people's evaluations of restoration projects on rivers (see full sample models in Table 3). We assumed that the evaluation of flooding risk would be more closely correlated to our two attitude items toward river restorations in people's own neighborhoods than to the two items on river restorations in general. In particular, we expected to find a closer relationship between evaluations of flooding risk and respondents' ratings on the two of the four specific attitude items: "restoring rivers in their own neighborhood for flood protection and ecological rehabilitation" and "restoring rivers in their own neighborhood even if flooding protection is not a priority" (see section 2.2.1.). The

specific attitudes toward river restorations in respondents' own neighborhoods, however, were not significantly correlated to perceived flooding risk either (r^1=0.044, n.s.; r^2=-0.008, n.s.). Perceived flooding risk showed to influence only negative attitudes (see Table 4). However, public flooding risk evaluation seems to be less influential on attitude formation toward restoration than expected on the basis of some previous findings and assumed by many restoration project managers.

It was also an interesting finding that the model factors and items used in this study could explain a much higher percentage of variance in negative attitudes than in positive attitudes. None of the extended model factors nor the behavioral model component showed to have significant influence on positive attitudes. The latter finding stands in contrast to Bright et al. (2002) who found that behavioral factors predicted both positive and negative attitudes. The relatively low percentage of explained variance in positive attitudes indicates that there might be additional factors not used in this model affecting positive attitudes, as for example indirect social interest, personal importance of landscape and nature, peoples' use of river corridors for recreational and leisure time activities (positive effect on attitude hypothesized) or economic land use or ownership in a river corridor (negative effect on attitude hypothesized).

Conclusions:

We have shown that not only do cognitive, behavioral and emotional factors affect attitude formation toward river restorations, but so too do social and procedural factors. This finding has both theoretical and practical implications. On the theoretical level, specific attitude objects need to be considered not only in terms of the established tripartite model factors, i.e. cognitive, emotional and behavioral factors, but also in terms of associated contextual factors. For river restorations there are social, procedural and flooding risk perception factors that apparently need to be considered in addition to cognitive, affective and behavioral factors when examining attitude formation.

On the practical level this extended understanding of the nature of attitudes can enhance managers' ability to avoid conflicts in regard to river restoration projects and to promote their active public support. Our findings support using more sophisticated participatory decision-making strategies in restoration projects, as often suggested in the recent literature (Beierle 2000; Pahl-Wostl 2002; Gregory 2003). Deliberative public participation instruments, such as future scenario workshops, public value forums, planning cells and advisory committees (Keeney et al. 1990; Gessenharter 1996, Beierle and Cayford 2002) could help to promote

an active information and communication process of the project management with the public and thus to clear peoples' perception of potential procedural barriers to a river restoration project (e.g. missing possibilities of the state and the canton; refusal of affected persons to make land available in the project perimeter). As previous studies have shown, actively involving a wide range of stakeholder groups including recreational users of the local river spaces will have beneficial effects beyond avoiding conflicts, such as increasing peoples identification with and their sense of local self-determination and responsibility for the local environment (cp. Junker and Buchecker in press). Fostering a social learning process by means of inclusive participatory planning and decision-making strategies will also likely have a positive influence on the subjective social norm of attitude toward river restorations, i.e. what people perceive to be the general opinion or consensus in their community on this issue. Both the subjective social norm, peoples' satisfaction with past decision-making in their own communities, procedural barriers and the perceived flooding risk tended to influence respondents with specifically negative attitudes. People with negative attitudes certainly belong to the group that is the one most likely to cause conflicts and the one that most need convincing of the benefits of river restorations. Due to the finding of previous studies (Junker and Buchecker 2006; Junker et al. in press) that the general public attitude toward river restorations is positive, the findings of this study imply that public discussion of projects should be encouraged by the managing project teams and that critiques should not be excluded from becoming involved in a participatory planning process. Using widely inclusive participatory strategies would thus help to implement river restoration projects more efficiently, to enhance their public approval and to make use of their full potential for educating the public about the environment.

Our results also indicate that how river restoration projects are planned and implemented has important feedback effects on public attitudes toward future restoration projects. If people are given sufficient opportunities to become involved in planning and deciding on river restorations in their own vicinity and if they are satisfied with this process, they will be more likely to view future projects positively. Feedback effects also involve emotional responses to former restoration projects and perceived social risks (e.g. conflicts caused by a restoration project in the community; perceived loss of local autonomy), both of which we found to be important factors for attitude formation in this study.

While this study has provided first insights on the underlying nature of attitudes toward river restoration, there remain several questions that should be explored more fully in future research. First of all, it would be helpful to learn more about factors influencing positive

attitudes. Further, more research is needed to examine the effects of different forms of public involvement and participatory planning strategies on attitude toward river restorations. A promising research scheme for doing so is a pre-/post-measurement method, as initial experiments in landscape planning have shown (Gehring et al. 2004; Buchecker and Hunziker 2006).

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Appendix

A: Curriculum Vitae
B: Questionnaire for survey of case study I
C: Questionnaire for survey of case study II
D: Questionnaire for nation-wide survey
(written; German, French and Italian language versions)
E: Questionnaire for nation-wide survey (phone)

Appendix A:

Curriculum Vitae

BERIT JUNKER

Born February 10th, 1974, in Erfurt, Germany.

Education

2002-2008	Swiss Institute for Forest, Snow and Landscape Research (WSL) and Department of Geography, University of Zurich, **PhD thesis:** „ The social perspective on river restorations – understanding a neglected aspect of sustainable river management"
1999-2001	McGill University – Montreal, Canada Degree: **Master of Arts (M.A.)** – Sociology;
1998-1999	Leopold-Franzens-University Innsbruck – Innsbruck, Austria Study of political and social sciences.
1998	Friedrich-Schiller-University Jena – Jena, Germany Study of social sciences.
1994-1998	University of Notre Dame – Notre Dame, Indiana, USA Degree: **Bachelor of Arts (B.A.)** – History, Sociology, Architecture
1996-1997	University of Notre Dame, 'Rome Architecture Program' – Rome, Italy
1987-1993	High school in Erfurt (Gymnasium "Pierre de Coubertin"); "Matura".

Appendix B:

Questionnaire for survey of case study I

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

KANTON THURGAU

DIE THUR ZWISCHEN WEINFELDEN UND BÜRGLEN

Zunächst einmal vielen Dank für Ihre Bereitschaft zur Mitarbeit. Wie von Herrn Gemeindeammann Armin Eugster im Neuen Anzeiger schon angekündigt, geht es in dieser Studie um Ihre Meinung und Ihre Vorstellungen zur Thur.
Sie können für Ihren Einsatz und das Ausfüllen des Fragebogens auch etwas **gewinnen**. Unter den Einsendungen bis zum 9.12. (Datum des Poststempels) werden **2 SBB-Tageskarten** im Wert von **je 50 Franken** ausgelost. Aber auch alle späteren Einsendungen werden begrüsst und fliessen in die Studie mit ein.
Alle gesammelten Daten werden vertraulich behandelt.

Einige Hinweise zum Ausfüllen des Fragebogens

Bevor Sie beginnen, beachten Sie bitte folgende Hinweise:

- Bitte lesen Sie die Fragen und die weiteren Anleitungen in aller Ruhe und gründlich durch.
- Es gibt keine guten oder schlechten Antworten. Wir sind nur an Ihrer persönlichen Meinung interessiert. Versuchen Sie deshalb, die Fragen spontan und ohne fremde Hilfe zu beantworten. Sie werden dafür rund 15 Minuten benötigen.
- Bitte beantworten Sie alle Fragen, auch wenn Sie sich bei einigen nicht ganz sicher sind. Entscheiden Sie sich für die Antworten, die für Sie am ehesten zutreffen.
- Verwenden Sie zum Ausfüllen des Fragebogens bitte möglichst einen Kugelschreiber.
- Haben Sie versehentlich ein falsches Kästchen angekreuzt, können Sie es zur Korrektur einkreisen …

  ❏ . ❏

  ...und dann ein anderes Kästchen ankreuzen ❏ ❏
- Falls in Ihrem Haushalt mehrere Personen diesen Fragebogen ausfüllen möchten, liegen im Postamt Bürglen noch weitere Exemplare aus

---

1 Wie oft gehen Sie an die Thur?

❏ täglich
❏ mehrmals pro Woche
❏ einige Male im Monat
❏ einige Male im Jahr
❏ nie

2 Wann gehen Sie an die Thur?

❏ in allen Jahreszeiten
❏ hauptsächlich im Sommerhalbjahr
❏ hauptsächlich im Winterhalbjahr

3 Was tun Sie an der Thur? (Mehrere Antworten möglich)

❏ Baden (Schwimmbad)	❏ Joggen	❏ Hund ausführen
❏ Baden (in der Thur)	❏ Arbeiten (z.B. Landwirtschaft)	❏ Fischen/Angeln
❏ Spazieren	❏ Brätlen/Feuer	❏ Velo fahren
❏ Reiten	❏ Ausruhen (liegen/sitzen/lesen)	❏ Nichts

❏ Anderes: .....

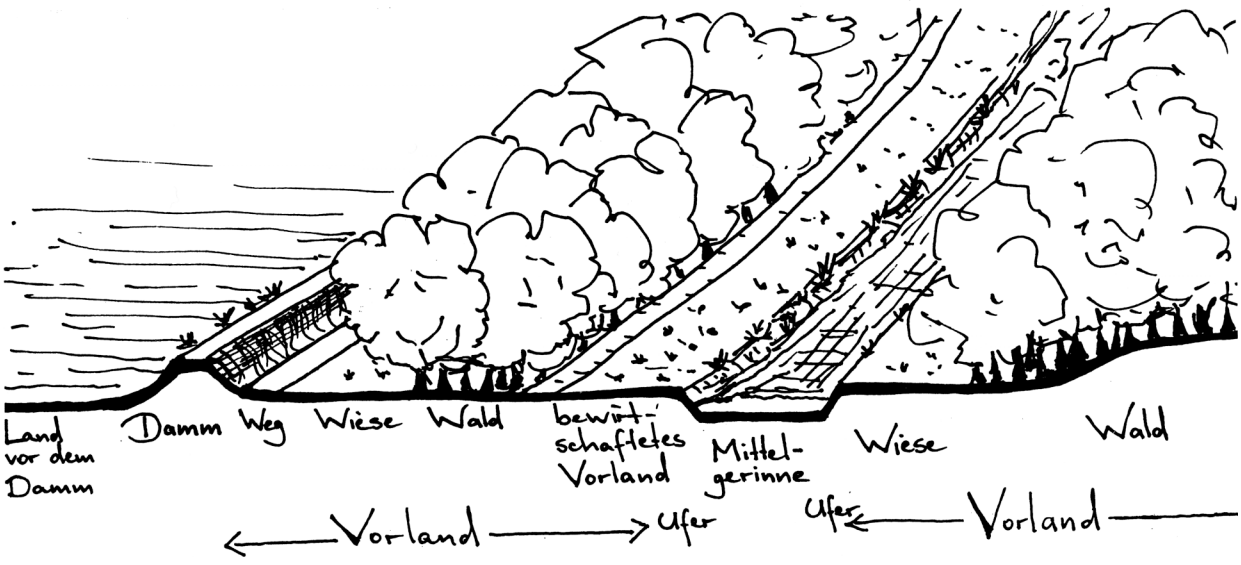
4 Stellen Sie sich vor, es gäbe an der Thur die geeigneten Möglichkeiten!
Welche Aktivitäten würden Sie dann gerne intensiver als bisher ausüben?

5 Was bedeutet die Thur für Sie? Bitte bewerten Sie die folgenden Aspekte von 0 – 4!
(0 - bedeutet mir nichts - bis - 4 - bedeutet mir sehr viel)

	0	**1**	**2**	**3**	**4**
Erholungsgebiet	❏	❏	❏	❏	❏
Natur	❏	❏	❏	❏	❏
Gefahr	❏	❏	❏	❏	❏
Wirtschaftliche Nutzung (z.B. Land-/Forstwirtschaft)	❏	❏	❏	❏	❏
Lebensader	❏	❏	❏	❏	❏
Schauspiel (etwas zum betrachten)	❏	❏	❏	❏	❏
Dynamik und Kraft	❏	❏	❏	❏	❏
Teil der Heimat	❏	❏	❏	❏	❏
Etwas, das zu mir gehört	❏	❏	❏	❏	❏
Gerinne (Entwässerung)	❏	❏	❏	❏	❏
Errungenschaft der Technik/ Bauwerk	❏	❏	❏	❏	❏

❏ Andere: .....

6 Was gehört für Sie alles zum Flussgebiet der Thur? Bitte markieren Sie unter der Skizze die Grenze links und rechts (z.B. je einen Kreis ankreuzen -- ❍ ❍ ❍ ❍ ❍ ❍ ❍ ❍ ❍ ❍



❍ ❍ ❍ ❍ ❍ ❍ ❍ ❍ ❍

Appendix C

Questionnaire for survey of case study II

Umfrage
zum Projekt Hochwasserschutz Samedan

Zunächst einmal vielen Dank für Ihre Bereitschaft zur Mitarbeit! Wie von Herrn Gemeindepräsident Thomas Nievergelt schon beschrieben, geht es in dieser Studie um Ihre Meinung zum Flazprojekt. Diese ist uns wichtig. Diese Umfrage ist Teil einer Forschungsarbeit an der WSL (Eidg. Forschungsanstalt für Wald, Schnee und Landschaft). Die Resultate sollen dazu beitragen, zukünftige Flussprojekte in der Schweiz erfolgreich durchführen zu können.
Ihre Angaben werden natürlich anonym behandelt. Die statistische Auswertung der Daten können Sie sich allerdings später ansehen (weitere Angaben dazu in einer späteren Ausgabe der La Padella)**. Bitte füllen Sie den Fragebogen aus und senden Sie ihn sobald wie möglich, spätestens jedoch bis zum 30. Juli 2004, im beiliegenden und bereits frankierten Antwortcouvert zurück. Weitere Fragebogen liegen auf der Gemeindeverwaltung aus.**

1

Wie sehr fühlen Sie sich vom Projekt „Flazverlegung“ persönlich betroffen?
❒ Gar nicht ❒ wenig ❒ mittel ❒ relativ stark ❒ sehr stark

In welchem Zusammenhang? (Mehrfachnennungen möglich!)
❒ Interessensvertreter ❒ Freizeitnutzer des Flussraums ❒ Vertreter der politischen Gemeinde ❒ Tourismusinvolvierte/r
❒ aktives Vereinsmitglied (wenn ja, in welchem): .....
❒ BürgerIn ❒ Landwirt ❒ Naturschützer
❒ andere Art der Betroffenheit: .....

.

2

Wie haben Sie das Gebiet um den ALTEN Flaz (Spazierwege Champagnatscha, Dämme, Golfseen, Cristansains) **- VOR der Ausführung des heutigen Flazprojekts genutzt?**
Und wie denken Sie werden Sie das Gebiet des NEUEN Flaz - NACH Fertigstellung des Projekts nutzen? (Bitte ankreuzen – Mehrfachnennungen sind möglich)

	DAVOR	DANACH
Spazieren	❒	❒
Fischen/Angeln	❒	❒
Baden (Golfseen)	❒	❒
Ausruhen (liegen/sitzen/lesen)	❒	❒
Velo fahren	❒	❒
Reiten	❒	❒
Joggen/Walken	❒	❒
Brätlen/Feuer	❒	❒
Hund ausführen	❒	❒
Landwirtschaft betreiben	❒	❒
Natur beobachten (Fauna, Flora)	❒	❒
Anderes:	❒	❒

3

Was hat Ihnen das Flussgebiet um den ALTEN Flaz bedeutet?

	Keine Bedeutung	**Wenig Bedeutung**	**Mittlere Bedeutung**	**Viel Bedeutung**	**Sehr viel Bedeutung**
Erholungsgebiet	❑	❑	❑	❑	❑
Natur	❑	❑	❑	❑	❑
Gefahr	❑	❑	❑	❑	❑
Wirtschaftliche Nutzung (z.B.Land-/Forstwirtschaft)	❑	❑	❑	❑	❑
Lebensader	❑	❑	❑	❑	❑
Ort der Dynamik und Kraft	❑	❑	❑	❑	❑
Teil der Heimat	❑	❑	❑	❑	❑
Etwas, das zu mir gehört	❑	❑	❑	❑	❑
Gerinne (Entwässerung)	❑	❑	❑	❑	❑
Errungenschaft der Technik/Bauwerk	❑	❑	❑	❑	❑
❑ Andere: welche?					

Nun würde uns interessieren, welche Bedeutung der NEUE Flussraum Ihrer Meinung nach für Sie haben wird (betrifft Flaz und Inn)? Bitte gehen Sie dazu noch einmal **zurück nach oben** zur vorhergehenden Frage und **kreisen** Sie nun jeweils das entsprechende Kästchen ein!

Beispiel:

	Keine Bedeutung	Wenig Bedeutung	Mittlere Bedeutung	Viel Bedeutung	Sehr viel Bedeutung
Erholungsgebiet	❑	☒	❑	❑	❑

Welche Bedeutung als Lebensraum allgemein hatte der Flussraum des ALTEN Flaz für Sie?
Bitte geben Sie dies auf der Skala mit einem Kreuz an!

❒ keine ❒ geringe ❒ mittlere ❒ grosse ❒ sehr grosse

Und welche Bedeutung als Lebensraum allgemein wird der Flussraum des NEUEN Flaz/Inn Ihrer Meinung nach für Sie haben? Bitte geben Sie dies auf der Skala mit einem Kreuz an!

❒ keine ❒ geringe ❒ mittlere ❒ grosse ❒ sehr grosse

4

Stellen Sie sich vor, es gäbe das neue Flazprojekt noch nicht:
In welchen Bereichen hätte man Ihrer Meinung nach wie viel am Flaz/Inn tun sollen – im Vergleich zum damaligen Zustand? Kreuzen Sie bitte für jeden Aspekt Ihre Wahl an!

	Viel weniger als damals	**Weniger als damals**	**So belassen wie damals**	**Mehr als damals**	**Viel mehr als damals**
Hochwasserschutz	❑	❑	❑	❑	❑
Wasserqualität	❑	❑	❑	❑	❑
Natürlichkeit	❑	❑	❑	❑	❑
Freizeiteinrichtungen	❑	❑	❑	❑	❑
Forstliche Nutzung	❑	❑	❑	❑	❑
Erholungsmöglichkeiten	❑	❑	❑	❑	❑
Landwirtschaftliche Nutzung	❑	❑	❑	❑	❑
Grundwasserqualität	❑	❑	❑	❑	❑
Gewässerpflege	❑	❑	❑	❑	❑
Tourismusinformation	❑	❑	❑	❑	❑
Naturschutz	❑	❑	❑	❑	❑

5

Haben Sie in der entsprechenden Gemeindeversammlung (am 15.6. 2000) **mit über das Projekt abgestimmt?** ❒ Ja ❒ Nein

Wenn ja, haben Sie <u>für</u> den Vorschlag des Gemeinderats gestimmt, die Flazverlegung durchzuführen? ❒ Ja, dafür ❒ Nein, dagegen

Wenn ja, was war für Sie Ausschlag gebend, dass Sie letztendlich für die Variante Flazverlegung gestimmt haben? Mehrere Optionen möglich!

❒ Hochwasserschutz
❒ Renaturierung
❒ Vergleich Kosten/Nutzen
❒ Nutzen für den Tourismus
❒ Langfristigkeit (Nachhaltigkeit) der Projektvariante
❒ Erholungsnutzen
❒ Mehrheitsmeinung ging in diese Richtung
❒ kompetente Personen haben diese befürwortet
❒ Subventionen des Kantons/Bundes
❒ anderes : .....

6

Wie zufrieden waren Sie mit ihren Möglichkeiten bei der Gestaltung des Flussprojekts mitzuwirken?

❒ Gar nicht zufrieden ❒ eher nicht zufrieden ❒ mässig zufrieden ❒ eher zufrieden ❒ absolut zufrieden

Welche anderen Möglichkeiten hätten Sie ausserdem gern gehabt?

❏ selbst die Initiative zu einem Projekt ergreifen
❏ Vorschläge einbringen im Rahmen eines Workshops
❏ andere: welche?.....
.....
❏ Ideen einbringen im Rahmen einer Umfrage
❏ in einer Arbeitsgruppe verschiedene Projektvorschläge mit ausarbeiten
❏ keine anderen

7

Was halten Sie heute vom Projekt „Flazverlegung“?

Ich finde es:

❏ grundsätzlich gut und unterstütze es
❏ eigentlich gut, würde aber einiges anders planen
❏ eigentlich gut, würde aber einiges in der Durchführung anders machen
❏ <u>nicht</u> gut
❏ unnötig
❏ grundsätzlich schlecht und unterstütze es nicht
❏ anderes: .....

Wie sah das vor dem Projekt aus? Hand auf`s Herz – was haben Sie zu Beginn der Planungen von der jetzt ausgeführten Variante gehalten?

Ich fand es:

❏ von Beginn an grundsätzlich gut und unterstützte es
❏ eigentlich gut, hätte aber einiges anders geplant
❏ eigentlich gut, hätte aber einiges in der Durchführung anders gemacht
❏ <u>nicht</u> gut
❏ unnötig
❏ grundsätzlich schlecht und unterstützte es nicht
❏ ich habe mich für ein anderes Projekt eingesetzt
❏ anderes: .....

Falls Sie Ihre Einstellung geändert haben – wissen Sie den Grund? .....
.....

8 **Welche Rolle haben für Sie die folgenden Kriterien gespielt für die erfolgreiche Planung und Ausführung der Flazverlegung?** Bitte geben Sie dies für alle der folgenden Kriterien an!

	gar nicht wichtig	wenig wichtig	mittel	wichtig	sehr wichtig
Information/Kommunikation durch die Projektleitung	❑	❑	❑	❑	❑
Ihr Vertrauen in die Vertreter Ihrer persönlichen Interessen	❑	❑	❑	❑	❑
frühere Erfahrungen mit Entscheidfindungen in der Gemeinde (vertrauensvolles Klima)	❑	❑	❑	❑	❑
Fotomontagen, wie das zukünftige Flussgebiet aussehen könnte	❑	❑	❑	❑	❑
Bauverbot in Teilen des Gemeindegebiets	❑	❑	❑	❑	❑
Mitwirkungsmöglichkeiten für die BürgerInnen der Gemeinde	❑	❑	❑	❑	❑
Fairness der Projektleitung	❑	❑	❑	❑	❑
Angebrachte Entschädigung der direkt betroffenen Grundeigentümer	❑	❑	❑	❑	❑
Subventionen des Kantons/Bundes	❑	❑	❑	❑	❑
Anderes:	❑	❑	❑	❑	❑

Nun zum Schluss nur noch einige Angaben zu Ihrer Person:

❑ Männlich ❑ weiblich

Alter: .....

Konfession: ❑ katholisch ❑ reformiert ❑ konfessionslos ❑ andere

Herkunft: ❑ Samedan Wenn ja, wie lange wohnen Sie schon hier? Seit .....
❑ andere Orte des Oberengadins
❑ Graubünden ❑ Schweiz
❑ Ausland

Herzlichen Dank für Ihre Mitarbeit!

Haben Sie noch Fragen oder Kommentare?

.....

.....

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Appendix D

Questionnaire for nation-wide survey
(written format, German version)

Flüsse und Bäche in der Schweiz

Wie sollen sie in Zukunft aussehen?

Foto: Glarner Fotoamateure, Copyright: Linth-Escher-Stiftung.

Grüezi

Aus der Gesamtbevölkerung der Schweiz wurden Sie zufällig für diese repräsentative Umfrage ausgewählt. Sie ist Teil eines Forschungsprojekts an der Eidg. Forschungsanstalt für Wald, Schnee und Landschaft (WSL) zu diesem Thema. Das Projekt wird auch von weiteren Bundesstellen mitgetragen, u.a. dem Bundesamt für Wasser und Geologie (BWG). Die Ergebnisse werden als Grundlage für die Planung zukünftiger Flussprojekte dienen. Damit die Ergebnisse der Umfrage möglichst die Einstellungen der gesamten Bevölkerung wiedergeben, ist es wichtig, dass Sie hier mitmachen.

Ihre Angaben werden selbstverständlich anonym behandelt.

Bitte schicken Sie den ausgefüllten Fragebogen im beiliegenden und bereits frankierten Antwortcouvert sobald wie möglich, spätestens jedoch bis zum **31. Dezember 2004** an uns zurück.

Einige Hinweise zum Ausfüllen des Fragebogens

- Am besten suchen Sie sich eine ruhige Stunde aus, machen Sie sich eine Tasse Kaffee oder Tee, setzen sich in eine bequeme Ecke und füllen den Fragebogen möglichst spontan aus. Das erste, was einem in den Sinn kommt, ist meist das Zutreffende. Dann dürfte das Ausfüllen nicht allzu lange dauern.
- Es gibt keine richtigen oder falschen Antworten. Wir sind nur an Ihrer persönlichen Meinung interessiert. Falls Sie Probleme mit der Deutschen Sprache haben, ist es gut, wenn Ihnen jemand hilft. Ansonsten füllen Sie den Fragebogen aber bitte alleine aus. Wir sind an Ihrer persönlichen Meinung interessiert.
- Bitte verwenden Sie einen dunklen Stift (z. B. schwarzen oder blauen Kugelschreiber, keinen Bleistift).
- Um eine falsche Antwort zu korrigieren, streichen Sie bitte die ungültige Antwort deutlich durch und machen am richtigen Ort ein Kreuzchen: ☒

Für Rückfragen:

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Herzlichen Dank für Ihre Mitarbeit!

WSL

Die Bedeutung von Flüssen und Bächen

Zuerst eine ganz generelle Frage: Wie stark ist Ihr persönlicher Bezug zu …

	sehr schwach	eher schwach	eher stark	sehr stark
… Flüssen, oder auch nur zu einem Fluss?	☐	☐	☐	☐
… Bächen, oder auch nur zu einem Bach?	☐	☐	☐	☐

Wie viel Bedeutung haben für Sie Flüsse allgemein und das Land entlang der Flüsse im Vergleich zu anderen Landschaftsräumen?

Für mich bedeuten Flüsse …

viel weniger	weniger	gleich viel	mehr	viel mehr	
☐	☐	☐	☐	☐	… als Berge.
☐	☐	☐	☐	☐	… als Seen.
☐	☐	☐	☐	☐	… als Äcker und Wiesen.
☐	☐	☐	☐	☐	… als Wald.
☐	☐	☐	☐	☐	… als Dörfer.
☐	☐	☐	☐	☐	… als Städte.

Was tun Sie persönlich an den Schweizer Flüssen? Wie häufig und wo?

was?	**wie häufig?**					**wo?**	
	mehrmals pro Woche	1x pro Woche	mehrmals pro Jahr	seltener	nie	vor allem innerhalb meiner Region	vor allem ausserhalb meiner Region
Spazieren _____	☐	☐	☐	☐	☐	☐	☐
Fischen/Angeln _____	☐	☐	☐	☐	☐	☐	☐
Baden _____	☐	☐	☐	☐	☐	☐	☐
Ausruhen/Entspannen _____	☐	☐	☐	☐	☐	☐	☐
Velo fahren _____	☐	☐	☐	☐	☐	☐	☐
Reiten _____	☐	☐	☐	☐	☐	☐	☐
Joggen/Walken _____	☐	☐	☐	☐	☐	☐	☐
Brätlen/Picknicken _____	☐	☐	☐	☐	☐	☐	☐
Hund ausführen _____	☐	☐	☐	☐	☐	☐	☐
Arbeiten _____	☐	☐	☐	☐	☐	☐	☐
Natur beobachten _____	☐	☐	☐	☐	☐	☐	☐
Leute treffen _____	☐	☐	☐	☐	☐	☐	☐
Boot fahren _____	☐	☐	☐	☐	☐	☐	☐
Anderes:.....	☐	☐	☐	☐	☐	☐	☐

Wie weit entfernt wohnen Sie vom nächstgelegenen Fluss?

☐ direkt am Fluss ☐ weniger als 2 km
☐ 2 bis 10 km ☐ 10 bis 20 km ☐ mehr als 20 km

Dieser Fluss befindet sich auf meinem Gemeindegebiet: ☐ ja ☐ nein

Welche Bedeutung hat dieser Fluss mit angrenzendem Land für Sie persönlich?
(Bitte jeden Unterpunkt beantworten)

Für mich hat er … als …	sehr wenig Bedeutung	wenig Bedeutung	mittlere Bedeutung	grosse Bedeutung	sehr grosse Bedeutung
Erholungsgebiet	☐	☐	☐	☐	☐
Naturerlebnis	☐	☐	☐	☐	☐
Gefahrenquelle	☐	☐	☐	☐	☐
Raum für wirtschaftliche Nutzung (z. B. Land-/Forstwirtschaft)	☐	☐	☐	☐	☐
Lebensader	☐	☐	☐	☐	☐
Ökologisch wertvoller Raum	☐	☐	☐	☐	☐
Ort der Ruhe und Besinnung	☐	☐	☐	☐	☐
Teil der Heimat	☐	☐	☐	☐	☐
Etwas, das zu mir gehört	☐	☐	☐	☐	☐
Entwässerungsrinne	☐	☐	☐	☐	☐
Teil Ihres Lebensraums	☐	☐	☐	☐	☐
Errungenschaft der Technik/Bauwerk	☐	☐	☐	☐	☐
Ort für persönliche Herausforderung(en)	☐	☐	☐	☐	☐
Kindheitserinnerung	☐	☐	☐	☐	☐
Wildnis	☐	☐	☐	☐	☐
Anderes (Was?):	☐	☐	☐	☐	☐

Wie sehr stimmen Sie den folgenden Aussagen zu?

	stimme voll zu	stimme eher zu	stimme teilweise zu	stimme eher nicht zu	stimme gar nicht zu
Für mich sollte das Flussgebiet hier bei uns primär dem Wohl aller Gemeindemitglieder dienen. Dass ich mich dort erholen kann, ist zweitrangig.	☐	☐	☐	☐	☐
Für mich sollte das Gebiet hier bei uns am Fluss hauptsächlich mein persönlicher Erholungsraum sein, der meinem eigenen Wohlbefinden dient.	☐	☐	☐	☐	☐
Für mich gehört das Flussgebiet hier bei uns den Landeigentümern und Pächtern dieser Flächen. Ich erhebe keinen Anspruch darauf, es auch zu nutzen (z. B. zur Erholung).	☐	☐	☐	☐	☐

Wie stark sollte man aus Ihrer Sicht die folgenden Aspekte an den Flüssen in Ihrer Region fördern?
Kreuzen Sie bitte für jeden Aspekt Ihre Wahl an.

	viel weniger als bisher	weniger als bisher	so belassen wie jetzt	mehr als bisher	viel mehr als bisher	weiss nicht
Hochwasserschutz	☐	☐	☐	☐	☐	☐
Wasserqualität	☐	☐	☐	☐	☐	☐
Natürlichkeit (im Fluss)	☐	☐	☐	☐	☐	☐
Natürlichkeit (am Fluss)	☐	☐	☐	☐	☐	☐
Freizeiteinrichtungen	☐	☐	☐	☐	☐	☐
Forstliche Nutzung	☐	☐	☐	☐	☐	☐
Erholungsmöglichkeiten	☐	☐	☐	☐	☐	☐
Landwirtschaftliche Nutzung	☐	☐	☐	☐	☐	☐
Grundwasserqualität	☐	☐	☐	☐	☐	☐
Gewässerunterhalt	☐	☐	☐	☐	☐	☐
Besucherinformation	☐	☐	☐	☐	☐	☐
Naturschutz	☐	☐	☐	☐	☐	☐
Zugänglichkeit	☐	☐	☐	☐	☐	☐

Wie empfinden Sie den Zustand der Flüsse in Ihrer Region, die Sie kennen?
(Bitte wählen Sie für jedes Antwortpaar das passende Kästchen zwischen den folgenden Gegensätzen).

Die Flüsse ...

... sind kanalisiert.	☐	☐	☐	☐	☐	... haben einen freien Lauf.
... sind vom Menschen gezähmt.	☐	☐	☐	☐	☐	... sind völlig wild.
... sind naturnah.	☐	☐	☐	☐	☐	... sind naturfern.
... sind attraktiv als Erholungsgebiet.	☐	☐	☐	☐	☐	... sind unattraktiv als Erholungsgebiet.
... sind gut zugänglich.	☐	☐	☐	☐	☐	... sind schwer zugänglich.
... entsprechen meinem Wunschbild.	☐	☐	☐	☐	☐	... entsprechen **nicht** meinem Wunschbild.

Das Land entlang der Flüsse ...

... wird überwiegend wirtschaftlich genutzt.	☐	☐	☐	☐	☐	... ist überwiegend wirtschaftlich **un**genutzt.
... ist überwiegend in Privatbesitz und nicht öffentlich nutzbar.	☐	☐	☐	☐	☐	... ist überwiegend öffentlich nutzbar.

Hochwasserschutz

Welche Erfahrungen haben Sie persönlich mit Hochwasser gemacht? (Mehrere Antworten möglich)

- ☐ eigener Sachschaden
- ☐ Angst empfunden
- ☐ emotionale Betroffenheit durch Schäden in meiner Gemeinde
- ☐ eigene wirtschaftliche Verluste
- ☐ Mehraufwand durch Aufräumarbeiten
- ☐ Einschränkungen in den Freizeit- und Erholungsmöglichkeiten
- ☐ Gefühl der Solidarität unter den Gemeindemitgliedern
- ☐ Freude an der Kraft der Natur
- ☐ Betroffenheit über Hochwasserschäden in anderen Regionen.

- ☐ Andere .....
- ☐ Keine

In welchem Jahr gab es das letzte Hochwasser in Ihrer Wohngemeinde?

.....

Wie schätzen Sie das Hochwasser-Risiko für den Flussabschnitt in der Nähe Ihrer Wohngemeinde ein?

☐ äusserst niedrig ☐ niedrig ☐ mittel ☐ hoch ☐ sehr hoch

Die Revitalisierung von Flüssen und Bächen

In den letzten Jahren wurden in der Schweiz vermehrt Projekte in Angriff genommen, die den Schutz vor Hochwasser verbessern sollen, indem den Flüssen mehr Raum gegeben wird. Mit solchen Massnahmen (**Revitalisierungen** genannt) soll gleichzeitig naturnaher Lebensraum für Tiere und Pflanzen wieder hergestellt werden.
Damit Flüsse und Bäche wieder naturnahen Lebensraum bilden können, bräuchten sie jedoch im jeweiligen Gebiet zwei bis drei mal mehr Platz als heute. Daher bedeuten solche Revitalisierungen auch den Verlust von bisher wirtschaftlich genutztem Land. Dementsprechend sind solche Flussprojekte ein kontroverses Thema. Deshalb ist uns Ihre Meinung darüber wichtig.

Was halten Sie von Revitalisierungen in den folgenden Fällen?

Ich bin …	stark dagegen	eher dagegen	eher dafür	stark dafür
… dass man Flüsse in der Schweiz revitalisiert.	☐	☐	☐	☐
… dass man einen Fluss in meiner Wohngegend revitalisiert.	☐	☐	☐	☐
… dass man Flüsse in der Schweiz revitalisiert, auch ohne dass dabei der Hochwasserschutz im Vordergrund steht.	☐	☐	☐	☐
… dass man einen Fluss in meiner Wohngegend revitalisiert, auch ohne dass dabei der Hochwasserschutz im Vordergrund steht.	☐	☐	☐	☐
… dass man kleinere Bäche in der Schweiz wieder aus den Röhren und Kanälen holt.	☐	☐	☐	☐
… dass man die kleineren Bäche in meiner Wohngegend wieder aus den Röhren und Kanälen holt.	☐	☐	☐	☐

Welchen Betrag (CHF) wären Sie bereit, jährlich (zusätzlich zu Ihren bisherigen Steuern) zu bezahlen für die Revitalisierung …

	5	10	20	30	50	gar nichts
... von Fliessgewässern irgendwo in der Schweiz?	☐	☐	☐	☐	☐	☐
... des nächstgelegenen Flusses (so dass Sie die naturnahe Flusslandschaft eventuell auch mehr für Ihre Erholung nutzen könnten)?	☐	☐	☐	☐	☐	☐

Was halten Sie von den folgenden Aussagen?

	stimme voll zu		stimme teilweise zu		stimme gar nicht zu	weiss nicht
Es gibt noch eine Menge natürlicher Flüsse und die Gesellschaft muss nicht kostbares Geld verschwenden, um Flüsse zu «revitalisieren».	☐	☐	☐	☐	☐	☐
Man sollte Revitalisierungen primär in Gebieten vornehmen, die kaum noch natürliche Flächen haben.	☐	☐	☐	☐	☐	☐
Eine revitalisierte Natur ist eine falsche Natur. Natürlichkeit kann durch Menschenhand nicht wiederhergestellt werden.	☐	☐	☐	☐	☐	☐
Revitalisierte Flüsse sind kein Luxus, sondern eine Notwendigkeit.	☐	☐	☐	☐	☐	☐
Solange die Eigentümer von Land der benötigten Vorländer eine gute Entschädigung erhalten, kann ich Revitalisierung befürworten.	☐	☐	☐	☐	☐	☐
Meiner Meinung nach sind Revitalisierungen zu teuer.	☐	☐	☐	☐	☐	☐
Wenn man heute Hochwasserschutz betreibt, sollte man die Chance nutzen,um die betreffenden Fliessgewässer gleichzeitig zu revitalisieren.	☐	☐	☐	☐	☐	☐
Wenn man Flüsse revitalisiert, sollte man Naturschutzgebiete daraus machen.	☐	☐	☐	☐	☐	☐
Wenn man Flüsse revitalisiert, sollte man den Menschen unbedingt die Möglichkeit geben, das jeweilige Gebiet zur Erholung und Freizeit zu nutzen.	☐	☐	☐	☐	☐	☐

Was halten Sie von den folgenden Aussagen?

	stimme voll zu		stimme teilweise zu		stimme gar nicht zu
Ich glaube, dass Wissenschaft und Technologie in der Lage sind, unsere komplexen ökologischen Probleme zu lösen und unsere Umwelt zu retten.	☐	☐	☐	☐	☐
Die Nutzungsinteressen haben für mich Vorrang vor dem Schutz von Tier- und Pflanzenarten.	☐	☐	☐	☐	☐
Ich schätze mich selbst als einen sehr naturverbundenen Menschen ein.	☐	☐	☐	☐	☐

Nun sehen Sie sich bitte die verschiedener Varianten eines Flussabschnitts an! Schätzen Sie bitte für jedes Foto die folgenden Fragen ein:

Wie gefällt Ihnen der Zustand des jeweiligen Flussabschnitts? ➡ Z

Als wie natürlich empfinden Sie ihn? ➡ N

Wie sehr entspricht er Ihren persönlichen Ansprüchen an eine Flusslandschaft? ➡ A

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

	ganz wenig			mittel			sehr stark
Z	☐	☐	☐	☐	☐	☐	☐
N	☐	☐	☐	☐	☐	☐	☐
A	☐	☐	☐	☐	☐	☐	☐

Angenommen den Fall, Ihre Gemeindekasse erhält eine separate Spende von 10 Millionen Franken für Massnahmen zur Aufwertung auf Ihrem Gemeindegebiet. Hierbei müsste diese gesamte Spende verwendet werden. Wie viel würden Sie davon ausgeben für die folgenden Massnahmen?

– Ein historisches Gebäude renovieren	..... Mio.
– Lokale Kulturveranstaltungen organisieren	..... Mio.
– Einen Spielplatz errichten oder erweitern	..... Mio.
– Einen Bach revitalisieren	..... Mio.
– Das Sportangebot verbessern	..... Mio.
– Ein Stück Fluss revitalisieren	..... Mio.
– Bäume im Gemeindegebiet pflanzen	..... Mio.
– Anreize für ökologische Ausgleichsflächen schaffen	..... Mio.
– Günstiges Gewerbeland kaufen	..... Mio.
– Strassenbau in der Gemeinde	..... Mio.
	10 Mio.

Wie schätzen Sie die folgende Aussage ein?

	sehr schlecht	eher schlecht	weder noch	eher gut	sehr gut	weiss nicht
Die Leute in meiner Gemeinde finden die Idee, Flüsse in unserer Gegend zu revitalisieren …	☐	☐	☐	☐	☐	☐

Welches Revitalisierungsprojekt kommt Ihnen spontan in den Sinn?

..... ☐ Mir kommt keines in den Sinn.

Wenn nun ein Fluss in Ihrer Region revitalisiert werden soll …
Mit welchen längerfristigen Auswirkungen eines Projekts würden Sie für die einzelnen Aspekte rechnen?

Auswirkungen	starke Verschlechterung			bleibt gleich			starke Verbesserung	weiss nicht
Erholungsmöglichkeiten	☐	☐	☐	☐	☐	☐	☐	☐
Grundwasserprobleme	☐	☐	☐	☐	☐	☐	☐	☐
Zugänglichkeit zum Fluss	☐	☐	☐	☐	☐	☐	☐	☐
Hochwasserschutz	☐	☐	☐	☐	☐	☐	☐	☐
Landwirtschaftliche Nutzung	☐	☐	☐	☐	☐	☐	☐	☐
Natürlichkeit am Fluss	☐	☐	☐	☐	☐	☐	☐	☐
Natürlichkeit im Fluss	☐	☐	☐	☐	☐	☐	☐	☐
Wasserqualität	☐	☐	☐	☐	☐	☐	☐	☐
Wirtschaftliche Entwicklung der Gemeinde	☐	☐	☐	☐	☐	☐	☐	☐

Auswirkungen	starke Verschlechterung			bleibt gleich			starke Verbesserung	weiss nicht
Vielfalt von Pflanzen und Tieren	☐	☐	☐	☐	☐	☐	☐	☐
Lebensqualität	☐	☐	☐	☐	☐	☐	☐	☐
Schönheit des Flussraums	☐	☐	☐	☐	☐	☐	☐	☐
Heimatgefühl	☐	☐	☐	☐	☐	☐	☐	☐
Unterhaltskosten	☐	☐	☐	☐	☐	☐	☐	☐

Angenommen, an einem Fluss in Ihrer Wohngegend soll ein Hochwasserschutz- und Revitalisierungsprojekt durchgeführt werden. Wie stark würden Sie sich persönlich davon betroffen fühlen?

☐ sehr wenig ☐ eher wenig ☐ mittel ☐ eher stark ☐ sehr stark

Welche Gründe gibt es aus Ihrer Sicht, die gegen eine Revitalisierung sprechen?
(Mehrere Antworten möglich)

	stimme voll zu	stimme eher zu	stimme eher nicht zu	stimme gar nicht zu
Es würden zu hohe Kosten für die Gemeindekasse entstehen.	☐	☐	☐	☐
Es würde zu Konflikten in der Gemeinde kommen.	☐	☐	☐	☐
Entscheide der kantonalen und Bundesbehörden würden die Autonomie der Gemeinde einschränken.	☐	☐	☐	☐
Die Existenz von Bewirtschaftern im Flussraum wäre gefährdet.	☐	☐	☐	☐
Die Bürger der Gemeinde könnten bei der Planung nicht in ausreichender Form mitwirken.	☐	☐	☐	☐
Naturschutzmassnahmen sind in meiner Gemeinde unbeliebt.	☐	☐	☐	☐

Andere (Welche?): .....

Wodurch könnten Revitalisierungen Ihrer Meinung nach verhindert werden?
(Bitte für alle Aussagen ankreuzen)

	sehr unwahr-scheinlich	eher unwahr-scheinlich	eher wahr-scheinlich	sehr wahr-scheinlich
Betroffene Personen weigern sich, das benötigte Land gegen Entschädigung zur Verfügung zu stellen.	☐	☐	☐	☐
Fehlende Finanzierungsmöglichkeiten durch Bund und Kantone.	☐	☐	☐	☐
Widerstand der Bevölkerung der Gemeinde.	☐	☐	☐	☐
Politischer Widerstand durch Interessensgruppen.	☐	☐	☐	☐
Beschränkte gesetzliche Möglichkeiten zur Durchsetzung (z.B. bei der Enteignung).	☐	☐	☐	☐

Anderes (Was?): .....

Wie gut sind Sie Ihrer Einschätzung nach informiert …

	sehr gut	eher gut	teils teils	eher schlecht	sehr schlecht
… über das Thema Revitalisierung von Flüssen oder Bächen?	☐	☐	☐	☐	☐
… darüber, wie man versucht, vor Hochwasser zu schützen?	☐	☐	☐	☐	☐
… darüber, was an Ihrem Fluss bisher so alles geschehen ist?	☐	☐	☐	☐	☐
… darüber, was an Ihrem Fluss so alles kreucht und fleucht?	☐	☐	☐	☐	☐
… darüber, wie das Zusammenspiel in der Natur funktioniert?	☐	☐	☐	☐	☐

Welches Interesse haben Sie persönlich am Thema Revitalisierungen?

☐ sehr wenig ☐ eher wenig ☐ mittel ☐ eher stark ☐ sehr stark

Mitbestimmung

Wie viel Vertrauen haben Sie in die folgenden Behörden und Stellen, dass sie kompetente Entscheide bezüglich der Zukunft der Flüsse und Bäche fällen?

	sehr wenig Vertrauen	eher wenig Vertrauen	mittleres Vertrauen	eher viel Vertrauen	sehr viel Vertrauen
Bundesbehörden	☐	☐	☐	☐	☐
kantonale Behörden	☐	☐	☐	☐	☐
Gemeindebehörden	☐	☐	☐	☐	☐
Planer	☐	☐	☐	☐	☐
Wasserbauexperten	☐	☐	☐	☐	☐

Wer sollte Ihrer Meinung nach alles bei der Planung eines Revitalisierungsprojektes mit einbezogen werden? (Mehrere Antworten möglich)

☐ Behörden (kantonal)
☐ Behörden (Gemeinde)
☐ betreffende Gemeindekommissionen
☐ Parteien
☐ regionaler Gewerbeverband
☐ regionaler Bauernverband
☐ Naturschutzorganisationen/-vereine
☐ Bürgergemeinde
☐ Sportvereine
☐ Grundeigentümer
☐ Anwohner
☐ betroffene Bauern (Eigentümer und Pächter)
☐ Fischereiverein/Jagdverein
☐ Bevölkerung der direkt betroffenen Gemeinden
☐ Bevölkerung der Fluss abwärts liegenden Gemeinden
☐ Erholungsnutzer
☐ Andere (Wer?): .....

In welcher Form sollten Sie bei einem allfälligen Flussprojekt mitreden können? (bitte links ankreuzen)
Und welche dieser Formen würden Sie nach Ihrer Einschätzung persönlich nutzen? (bitte rechts ankreuzen)
(Jeweils mehrere Antworten möglich)

Sollte für mich möglich sein		Würde ich persönlich nutzen
☐	Informationsveranstaltungen (mit Diskussionsmöglichkeit)	☐
☐	Umfrage (in der man die eigenen Ansprüche einbringen kann)	☐
☐	Workshops (in denen man Vorschläge einbringen kann)	☐
☐	Arbeitsgruppe (in der man selbst verschiedene Projektvarianten mit ausarbeiten kann)	☐
☐	Einwände vorbringen (Mitwirkungsverfahren)	☐
☐	Delegation eines Vertreters Ihrer Interessen für Mitarbeit in einer Arbeitsgruppe	☐
☐	Abstimmen über mehrere Projektvarianten	☐
☐	Abstimmen über das fertige Projekt	☐
☐	Einsprache zum Projekt erheben	☐
☐	Initiative zu einem Projekt ergreifen	☐
☐	Andere: (Welche?)	☐
☐	gar keine	

Was meinen Sie zu den folgenden Aussagen, wenn es um den Einbezug bei einem allfälligen Revitalisierungsprojekt in Ihrer Wohngegend geht?

	stimme gar nicht zu	stimme eher nicht zu	stimme eher zu	stimme völlig zu	weiss nicht
Die Politiker kennen die Bedürfnisse der Bevölkerung gut genug, um sie zu vertreten.	☐	☐	☐	☐	☐
Der Einbezug der Bevölkerung ist wichtig, damit lokales Wissen mit in das Projekt einfliessen kann.	☐	☐	☐	☐	☐
Ich würde gerne mitreden, damit meine Anliegen mit berücksichtigt werden.	☐	☐	☐	☐	☐
Ich würde gerne mitreden, damit die Interessen meiner Interessensgruppe mit berücksichtigt werden.	☐	☐	☐	☐	☐
Viele Leute, die ich kenne, würden ihre Anliegen gerne aktiv im Entscheidungsprozess mit einbringen.	☐	☐	☐	☐	☐
Individuelles Engagement ist in meiner Gemeinde nicht so gern gesehen.	☐	☐	☐	☐	☐
Ich denke, die Experten finden die beste Lösung, ohne dass viele andere mitreden.	☐	☐	☐	☐	☐

Was könnte Sie daran hindern, bei einem Revitalisierungsprojekt mitzuwirken?
(Mehrere Antworten möglich)

- ☐ Ich habe zu wenig Wissen über das Thema.
- ☐ Ich habe zu wenig Interesse am Thema.
- ☐ Ich passe nicht zu dem Kreis Leute, der da mitredet.
- ☐ Ich bin nicht der politische Typ.
- ☐ Andere können das besser.
- ☐ Die Meinung von Leuten wie mir wird letztendlich ja doch nicht berücksichtigt.
- ☐ Ich möchte keine Konflikte verursachen.
- ☐ Ich habe zu wenig Zeit.
- ☐ Anderes (Was?): .....

Wurde in Ihrer Region schon ein Revitalisierungsprojekt geplant oder durchgeführt?

- ☐ ja, es wurde bereits eines geplant oder ausgeführt.
- ☐ ja, es wird gerade eines geplant oder ausgeführt.
- ☐ nein, es wird oder wurde keins geplant oder ausgeführt.

Falls Sie mit «ja» geantwortet haben: Welches Gefühl hat dieses Projekt insgesamt bei Ihnen hinterlassen?

ein sehr schlechtes	ein eher schlechtes	teils, teils	eher gutes	sehr gutes	weis nicht
☐	☐	☐	☐	☐	☐

Nun noch einmal weg vom Thema Revitalisierungen:

In welcher Form haben Sie sich selbst schon einmal für Ihre eigenen Anliegen oder die Lebensbedingungen allgemein in Ihrer Gemeinde eingesetzt?

- ☐ an eine Informationsveranstaltung gegangen
- ☐ in einer Arbeitsgruppe mitgearbeitet
- ☐ an einem Workshop teilgenommen
- ☐ vor Leuten über Probleme in der Gemeinde Stellung bezogen
- ☐ mit einem Verein für ein Anliegen aktiv eingesetzt
- ☐ Kommissionsarbeit oder Parteiarbeit geleistet
- ☐ eine Petition mitgetragen
- ☐ eine Einsprache erhoben
- ☐ ein politisches Amt ausgeübt
- ☐ an einer Gemeindeversammlung teilgenommen
- ☐ in keiner Form
- ☐ Anderer (Welcher?): .....

Wie wichtig wäre Ihnen die Möglichkeit, in den folgenden Bereichen persönlich mitreden zu können?

	sehr wichtig	recht wichtig	mittel	recht unwichtig	sehr unwichtig
Gestaltung eines Platzes im Quartier oder Dorf	☐	☐	☐	☐	☐
Schulfragen	☐	☐	☐	☐	☐
Verkehrskonzept für Ihre Gemeinde	☐	☐	☐	☐	☐
Einrichten eines Naturschutzgebietes	☐	☐	☐	☐	☐
Bestimmung des Standorts einer Verbrennungsanlage	☐	☐	☐	☐	☐
Ortsplanung	☐	☐	☐	☐	☐
Flussprojekt (Hochwasserschutz und Revitalisierung)	☐	☐	☐	☐	☐
Landschaftsentwicklungskonzept Ihrer Region	☐	☐	☐	☐	☐

Und wie zufrieden sind Sie damit, wie wichtige Entscheidungen in Ihrer Gemeinde in den letzten zehn Jahren zustande gekommen sind?

☐ sehr unzufrieden ☐ eher unzufrieden ☐ teils, teils ☐ eher zufrieden
☐ sehr zufrieden ☐ weiss nicht

Wie bewerten Sie die folgenden Punkte zu Ihrer eigenen Situation in Ihrer Wohngemeinde?
(Bitte bewerten Sie alle Aussagen)

	trifft gar nicht zu	trifft eher nicht zu	teils, teils	trifft eher zu	trifft völlig zu
Ich betrachte sie als mein Zuhause.	☐	☐	☐	☐	☐
Hier betrachte ich mich als zugehörig.	☐	☐	☐	☐	☐
Ich könnte genauso gut wo anders wohnen.	☐	☐	☐	☐	☐
Ich habe in meiner Gemeinde viel bewirkt.	☐	☐	☐	☐	☐
Hier kenne ich viele Leute.	☐	☐	☐	☐	☐
Hier fühle ich mich akzeptiert.	☐	☐	☐	☐	☐

Und nun ganz zum Schluss nur noch einige

Angaben zu Ihrer Person

Ihr Geschlecht? ☐ weiblich ☐ männlich **Ihr Alter?** (in Jahren) .....

Wo wohnen Sie?

☐ Stadt
☐ Agglomeration
☐ Land

Wie lange wohnen Sie schon in Ihrem derzeitigen Wohnort?

☐ weniger als 5 Jahre
☐ länger als 5 Jahre
☐ länger als 10 Jahre
☐ länger als 20 Jahre
☐ wohne schon immer dort

Welche Postleitzahl hat Ihre Wohngemeinde? .....

Wie viele Personen leben in Ihrem Haushalt? .....

Welchen höchsten Schulabschluss haben Sie?

- ☐ kein Schulabschluss
- ☐ Primarschule
- ☐ Sekundar-/Real-/Bezirksschule
- ☐ Berufsschule/Lehre
- ☐ Mittelschule, Gymnasium, Seminar
- ☐ Höhere Fach- oder Berufsausbildung
- ☐ Fachhochschule, Hochschule

Welchen Beruf haben Sie? .....

Haben Sie oder Ihre Familie Besitz an einem Fluss (oder Bach)? ☐ ja ☐ nein

Nutzen Sie Land an einem Fluss oder Bach wirtschaftlich? ☐ ja ☐ nein
(z.B. Land- oder Forstwirtschaft, Industrie, Handwerk o.ä.)

Sind Sie Mitglied in einem Verein, einer Organisation oder Interessensgruppe? (mehrere Antw. möglich)

	Vereine und Organisationen		*berufliche Interessengruppen*
	aktiv	passiv	
Sport:	☐	☐	☐ Gewerbeverband
Jagd:	☐	☐	☐ Bauernverband
Fischerei:	☐	☐	☐ Andere: .....
Naturschutz:	☐	☐	.....
Andere:	☐	☐	.....

Üben Sie ein öffentliches Amt aus? ☐ nein ☐ ja, welches? .....

Sind Sie beruflich im Bereich Umwelt, Ökologie, Natur oder Landschaft tätig?

☐ ja ☐ nein

Sind Sie Mitglied in einer Umwelt-Organisation (z.B. WWF, Pro Natura, Greenpeace, usw.)?

☐ ja ☐ nein

Sind Sie SchweizerIn? ☐ **Oder leben Sie in der Schweiz als AusländerIn?** ☐

Bevorzugen Sie eine bestimmte Partei?

- ☐ SVP
- ☐ SP
- ☐ CVP
- ☐ Grüne
- ☐ FDP
- ☐ Andere: .....
- ☐ nein, ich bevorzuge keine bestimmte Partei.

Herzlichen Dank für Ihre Mitarbeit!

Haben Sie noch Fragen oder Kommentare?

.....

.....

.....

Appendix E

Questionnaire for nation-wide survey (phone)

Telefonische Umfrage WSL:
„Wie soll die Zukunft der Flüsse und Bäche in der Schweiz aussehen?"

Guten Tag, ich rufe Sie im Auftrag eines Forschungsinstituts des Bundes, der WSL, an.
(nur falls vom Interviewten gewünscht, den vollen Namen angeben: Eidgenössische Forschungsanstalt für Wald, Schnee und Landschaft).
Es handelt sich um eine gesamtschweizerische Umfrage zum Thema „Wie soll die Zukunft der Schweizer Flüsse und Bäche aussehen?" .
Die Ergebnisse werden als Grundlage für die Planung zukünftiger Flussprojekte dienen. Sie wurden für diese Umfrage zufällig ausgewählt. Damit das Ergebnis der Umfrage möglichst die Einstellung der gesamten Bevölkerung wiedergibt, ist es wichtig, dass Ihre Antworten hier mit einfliessen.

(Falls der/die Angerufene gerade keine Zeit hat:
Darf ich sie zu einem späteren Zeitpunkt noch einmal anrufen?

Ihre Angaben werden selbstverständlich anonym behandelt.

Postleitzahl Wohngemeinde ..... (wird automatisch registriert)

S1 Darf ich fragen, wie alt Sie sind? .....Jahre (15 – 74 Jahre)

S2 Geschlecht (informell ermitteln): ❑ weiblich ❑ männlich

Interview

- **1. Zuerst eine allgemeine Frage:**
  A)Wie stark fühlen sie sich persönlich Flüssen, oder auch nur einem Fluss verbunden?
- Sehr stark
- Eher stark
- Eher schwach
  Sehr schwach

B) Und wie stark fühlen Sie sich Bächen, oder auch nur einem Bach verbunden?
- Sehr stark
- Eher stark
- Eher schwach
  Sehr schwach

- **2.a) Ich lese Ihnen jetzt einiges vor, was man an Flüssen machen kann. Bitte geben Sie mir jeweils an, ob Sie etwas davon persönlich machen.**

• Spazieren	Ja,	Nein
Fischen/Angeln	Ja,	Nein
Baden	Ja,	Nein
Ausruhen oder Entspannen	Ja,	Nein
Velo fahren	Ja,	Nein
Joggen oder Walken	Ja,	Nein
Brätlen oder Picknicken	Ja,	Nein

Ihren Hund ausführen	Ja,	Nein
Arbeiten	Ja,	Nein
die Natur erkunden	Ja,	Nein
Leute treffen	Ja,	Nein
Boot fahren	Ja,	Nein

Filter: Wenn ja bei 2 a)

2. b) Wie häufig machen Sie das jeweils?

Spazieren	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Fischen/Angeln	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Baden	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Ausruhen oder Entspannen	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Velo fahren	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Joggen oder Walken	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Brätlen oder Picknicken	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Ihren Hund ausführen	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Arbeiten	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
die Natur erkunden	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Leute treffen	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche
Boot fahren	1= Seltener	2= mehrmals pro Jahr	3= 1x pro Woche	4=mehrmals pro Woche

3.a) Wie weit entfernt wohnen Sie vom <u>nächstgelegenen</u> Fluss?

- direkt am Fluss ☐ 1
- weniger als 2km entfernt ☐ 2
- 2 bis 10km entfernt ☐ 3
- mehr als 10 km ☐ 4

3.b) Befindet sich dieser Fluss auf Ihrem Gemeindegebiet? Ja ☐ 1; Nein ☐ 2

4. Ich lese Ihnen jetzt einiges vor. Bitte sagen, Sie mir, welche Bedeutung <u>dieser</u> (nächstgelegene) Fluss und das Ufergebiet für <u>Sie persönlich</u> jeweils hat . Wieviel Bedeutung hat dieser Fluss für Sie als...

- ANTWORTKATEGORIEN VORLESEN (bis die Befragten vor sich aus entsprechend antworten)
-

5. **Wie**

als	sehr wenig Bedeutung 1	wenig Bedeutung 2	Mittlere Bedeutung 3	grosse Bedeutung 3	sehr grosse Bedeutung 4
Erholungsgebiet	❑	❑	❑	❑	❑
Naturerlebnis	❑	❑	❑	❑	❑
Gefahrenquelle	❑	❑	❑	❑	❑
Raum für wirtschaftliche Nutzung (z.B.Land-/Forstwirtschaft)	❑	❑	❑	❑	❑
Lebensader	❑	❑	❑	❑	❑
Ökologisch wertvoller Raum	❑	❑	❑	❑	❑
Ort der Ruhe und Besinnung	❑	❑	❑	❑	❑
Teil der Heimat	❑	❑	❑	❑	❑
Etwas, das zu Ihnen gehört	❑	❑	❑	❑	❑
Entwässerungsrinne *(falls Nachfrage: Entwässerung für die Landschaft)*	❑	❑	❑	❑	❑
Teil Ihres Lebensraums	❑	❑	❑	❑	❑
Errungenschaft der Technik/Bauwerk	❑	❑	❑	❑	❑

empfinden Sie den Zustand der Flüsse in Ihrer Region, die Sie kennen? Ich nenne Ihnen jeweils 2 gegensätzliche Zustände 1 und 5.

- In welchem Zustand befinden sich die Flüsse in Ihrer Region? Mit den Zahlen zwischen 1 und 5 können Sie Ihre Angaben abstufen.

5.1. Sind die Flüsse eher kanalisiert, oder haben sie eher ein freies Ufer?

☐ 1 stark kanalisiert ☐ 2 eher kanalisiert ☐ 3 teils teils ☐ 4 eher freier Lauf ☐ 5 freier Lauf

5.2. Empfinden Sie den Flusslauf und die Uferregion als naturfern oder als naturnah?

☐ 1 naturfern ☐ 2 eher naturfern ☐ 3 teils teils ☐ 4 eher naturnah ☐ 5 naturnah

5.3. Sind die Flüsse in Ihrer Region unattraktiv für Sie als Erholungsgebiet oder attraktiv ?

☐ 1 unattraktiv ☐ 2 eher unattraktiv ☐ 3 teils teils ☐ 4 eher attraktiv ☐ 5 attraktiv

5.4. Sind diese Flüsse schwer zugänglich oder gut zugänglich?

☐ 1 schwer zugänglich ☐ 2 eher schwerzugänglich ☐ 3 teils teils ☐ 4 eher gut zugänglich ☐ gut zugänglich

5.5. Entsprechen die Flüsse in Ihrer Region Ihrem Wunschbild von einem Fluss wenig oder stark?

☐ 1 wenig ☐ 2 eher wenig ☐ 3 teils teils ☐ 4 eher stark ☐ 5 stark

6. Wie schätzen Sie das Hochwasser-Risiko für den Flussabschnitt in der Nähe Ihrer Wohngemeinde ein?

☐ 1 äusserst niedrig ☐ 2 niedrig ☐ 3 mittel ☐ 4 hoch ☐ 5 sehr hoch

Bitte Text langsam und deutlich vorlesen:

7. In den letzten Jahren wurden in der Schweiz vermehrt Projekte in Angriff genommen die den Schutz vor Hochwasser verbessern sollen, indem sie den Flüssen mehr Raum geben. Mit solchen Massnahmen (**Revitalisierungen** genannt) soll gleichzeitig naturnaher Lebensraum für Tiere und Pflanzen wieder hergestellt werden.
Damit Flüsse und Bäche wieder naturnahen Lebensraum bilden können, bräuchten sie jedoch im jeweiligen Gebiet 2 bis 3 mal mehr Platz als heute, welcher der wirtschaftlichen Nutzung verloren geht. Deshalb gehen die Meinungen über solche Flussprojekte weit auseinander:

- **Ich lese Ihnen jetzt einiges vor, bitte sagen Sie jeweils wie sehr Sie dafür oder dagegen sind. Wie sehr sind Sie dafür oder dagegen**

...dass man **Flüsse** in der **Schweiz** revitalisiert?
☐ 1 stark dagegen ☐ 2 eher dagegen ☐ 3 eher dafür ☐ 4 stark dafür

...dass man einen **Fluss** in Ihrer **Wohngegend** revitalisiert?
☐ 1 stark dagegen ☐ 2 eher dagegen ☐ 3 eher dafür ☐ 4 stark dafür

...dass man **Flüsse** in der **Schweiz** revitalisiert, auch **ohne** dass dabei der **Hochwasserschutz** im Vordergrund steht?
☐ 1 stark dagegen ☐ 2 eher dagegen ☐ 3 eher dafür ☐ 4 stark dafür

...dass man einen **Fluss** in Ihrer **Wohngegend** revitalisiert, auch **ohne** dass dabei der **Hochwasserschutz** im Vordergrund steht?
☐ 1 stark dagegen ☐ 2 eher dagegen ☐ 3 eher dafür ☐ 4 stark dafür

...dass man kleinere **Bäche** in der **Schweiz** wieder aus den Röhren und Kanälen holt?
☐ 1 stark dagegen ☐ 2 eher dagegen ☐ 3 eher dafür ☐ 4 stark dafür

...dass man die kleineren **Bäche** in Ihrer **Wohngegend** wieder aus den Röhren und Kanälen holt?
☐ 1 stark dagegen ☐ 2 eher dagegen ☐ 3 eher dafür ☐ 4 stark dafür

- **8. Wie naturverbunden schätzen Sie sich selbst ein?**
  ☐ 1 sehr wenig ☐ 2 eher wenig ☐ 3 teils/teils ☐ 4 eher stark ☐ 5 sehr stark

- **9. Was meinen Sie, wie die Leute in Ihrer Gemeinde die Idee finden, Flüsse in Ihrer Gegend zu revitalisieren? Würden Sie sagen, die Leute in Ihrer Gemeinde finden die Idee...**
- sehr schlecht;
- eher schlecht,
- weder noch;
- eher gut;
- sehr gut.

10. Einmal angenommen, ein Fluss in Ihrer Region soll revitalisiert werden. Welche Folgen würde das Ihrer Meinung nach längerfristig haben? Würden Sie sagen ...

...						
die Erholungsmöglichkeiten am Fluss würden sich	Stark verschlechtern	Etwas verschlechtern	Nicht ändern	Etwas verbessern	Sehr verbessern	k. a.

die Zugänglichkeit zum Fluss würde sich…	❑	❑	❑	❑	❑	❑
der Hochwasserschutz würde sich…	❑	❑	❑	❑	❑	❑
die Natürlichkeit **am** Fluss würde sich…	❑	❑	❑	❑	❑	❑
die Wasserqualität würde sich…	❑	❑	❑	❑	❑	❑
die Wirtschaftliche Entwicklung der Gemeinde würde sich…	❑	❑	❑	❑	❑	❑
Ihre Lebensqualität würde sich…	❑	❑	❑	❑	❑	❑
die Schönheit des Flussraums würde sich…	❑	❑	❑	❑	❑	❑

- **11. Angenommen, an einem Fluss <u>in Ihrer Wohngegend</u> soll so ein Hochwasserschutz- und Revitalisierungsprojekt durchgeführt werden. Wie stark würden Sie sich persönlich davon betroffen fühlen?**
  ☐ 1 sehr wenig ☐ 2 eher wenig ☐ 3 mitteL ☐ 4 eher stark ☐ 5 sehr stark

- **12.a) Wie gut fühlen sie sich informiert …**

  …. **über das Thema Revitalisierung von Flüssen oder Bächen?**
  Sehr gut
  Eher gut
  Unentschieden
  Eher schlecht
  Sehr schlecht

  12.b) ….darüber, was an dem Fluss, zu dem Sie am meisten Bezug haben, bisher aus wasserbaulicher Sicht so alles geschehen ist?
  Sehr gut
  Eher gut
  Unentschieden
  Eher schlecht
  Sehr schlecht

13. Noch einmal angenommen, an einem Fluss in Ihrer Wohngegend soll ein Hochwasserschutz- und Revitalisierungsprojekt durchgeführt werden:

- **In welcher Form sollten <u>Sie</u> bei einem allfälligen Flussprojekt mit einbezogen werden?** Ich gebe Ihnen einige Formen des Einbezugs an und Sie sagen mir bitte, ob diese jeweils für Sie möglich sein sollte, oder ob sie nicht möglich sein sollte.

  Durch…
  a) … Informationsveranstaltungen, in denen man Fragen aufwerfen kann ja ☐ 1 nein ☐ 2
  b) … eine Umfrage, in der man die eigenen Ansprüche einbringen kann ja ☐ 1 nein ☐ 2
  c) … Workshops, in denen man Vorschläge einbringen kann ja ☐ 1 nein ☐ 2
  d) … eine Arbeitsgruppe, in der man selbst verschiedene Projektvarianten mit ausarbeiten kann ja ☐ 1 nein ☐ 2

e) ... ein Mitwirkungsverfahren, in dem man Einwände vorbringen kann ja ☐ 1 nein ☐ 2
f) ... die Delegation eines Vertreters Ihrer Interessen für die Mitarbeit in einer Arbeitsgruppe ja ☐ 1 nein ☐ 2
g) ... eine Abstimmung über mehrere Projektvarianten ja ☐ 1 nein ☐ 2
h) ... eine Abstimmung über das fertige Projekt ja ☐ 1 nein ☐ 2

Filter: Wenn ja bei F 15

- **14. Und welche dieser Formen würden Sie nach Ihrer Einschätzung tatsächlich persönlich nutzen?**

... Informationsveranstaltungen, in denen man Fragen aufwerfen kann ja ☐ 1 nein ☐ 2
... eine Umfrage, in der man die eigenen Ansprüche einbringen kann ja ☐ 1 nein ☐ 2
... Workshops, in denen man Vorschläge einbringen kann ja ☐ 1 nein ☐ 2
... eine Arbeitsgruppe, in der man selbst verschiedene Projektvarianten mit ausarbeiten kann ja ☐ 1 nein ☐ 2
... ein Mitwirkungsverfahren, in dem man Einwände vorbringen kann ja ☐ 1 nein ☐ 2
... die Delegation eines Vertreters Ihrer Interessen für die Mitarbeit in einer Arbeitsgruppe ja ☐ 1 nein ☐ 2
... eine Abstimmung über mehrere Projektvarianten ja ☐ 1 nein ☐ 2
... eine Abstimmung über das fertige Projekt ja ☐ 1 nein ☐ 2

15. Wurde in Ihrer Region schon ein Revitalisierungsprojekt geplant oder durchgeführt?
(frei antworten lassen und Antworten in die folgenden Kategorien einordnen)
❒ ja, es wurde bereits eines geplant oder ausgeführt. =1
❒ ja, es wird gerade eines geplant oder ausgeführt. =2
❒ nein, es wird oder wurde keins geplant oder ausgeführt =3

Falls der/die Interviewte mit Kategorie „1" geantwortet hat, Frage stellen:
16. 1. Welches Gefühl hat dieses Projekt insgesamt bei Ihnen hinterlassen?
Ein sehr gutes
gutes
Teils teils
schlechtes
Sehr schlechtes Gefühl

16.2. Wie sinnvoll fanden Sie das Projekt insgesamt?
Sehr sinnvoll
sinnvoll
Teils teies
Weniger sinnvoll
Überhaupt nicht sinnvoll

16.3. Wie zufrieden waren Sie mit der Information über das Projekt?
Sehr zufrieden
zufrieden
Teils teils
unzufrieden
Sehr unzufrieden

16.4. Und wie zufrieden waren Sie mit Ihren Möglichkeiten, bei den Entscheidungen mitzureden.
Sehr zufrieden
zufrieden
Teils teils
unzufrieden
Sehr unzufrieden

Falls der/die Interviewte bei F 17 mit Kategorie „3" geantwortet hat (noch kein Revitalsierungsprojekt durchgeführt wurde oder sich in Planung befindet - , Frage stellen:

17. Fällt Ihnen zufällig ein Revitalisierungsprojekt ein, kommt Ihnen spontan eins in den Sinn?

- Ja, und zwar.....
  Nein, Mir kommt **keines** in den Sinn.

Falls der/die Interviewte mit Kategorie „2" geantwortet hat, bitte weiter zu den „Angaben zur Person":

Und nun ganz zum Schluss nur noch einige **Angaben zu Ihrer Person:**

S3 Wie lange wohnen Sie schon in Ihrem derzeitigen Wohnort?
(bitte Anzahl der Jahre angeben lassen und in folgende Kategorien einordnen)

weniger als 5 Jahre	☐ 1
länger als 5 Jahre	☐ 2
länger als 10 Jahre	☐ 3
länger als 20 Jahre	☐ 4
wohne schon immer dort	☐ 5

S4 Welchen Beruf haben Sie?
.....

S5 Haben Sie oder Ihre Familie Besitz an einem Fluss (oder Bach)? ja ☐ 1
nein ☐ 2

S6 Nutzen Sie Land an einem Fluss oder Bach wirtschaftlich? ja ☐ 1
nein ☐ 2
(z.B. Land- oder Forstwirtschaft, Industrie, Handwerk o.ä.)

S 7 Sind Sie Mitglied in einem Verein, einer Organisation oder Interessensgruppe?
ja ☐ 1 nein ☐ 2

Filter: Wenn Ja bei S 7
S 7.1 In welchem?

Sport:	❑ 1
Jagd:	❑ 2
Fischerei:	❑ 3
Naturschutz:	❑ 4
Andere	❑ 5

S 8 Sind Sie Mitglied in einer berufliche Interessensgruppen, wie z.B. im Gewerbeverband oder Bauernverband?

Gewerbeverband:	❑ 1
Bauernverband	❑ 2
Andere	❑ 3

S 9 Üben Sie ein öffentliches Amt aus? 2 ❑ nein 1 ❑ ja

S 10 Bevorzugen Sie eine bestimmte Partei?

❑ SVP; 1	❑ CVP; 2	❑ FDP; 3	❑ nein, bevorzuge
❑ SP; 4	❑ Grüne; 5	❑ andere; 6	keine bestimmte Partei; 7

Herzlichen Dank für Ihre Mitarbeit!